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Taxonomic and biological studies on the Miridae of Mississippi (Hemiptera)

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NOTE TO USERS

TAXONOMIC AND BIOLOGICAL STUDIES ON THE MIRIDAE OF MISSISSIPPI (HEMIPTERA)

BY

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INTRODUCTION

But little has been published regarding the distribution and food plants of Miridae from the southern and southwestern United States. Blatchley's "Heteroptera of Eastern North America, 1926" was based largely upon records from the northeastern United States, Indiana and Florida, with but few records from Mississippi. Many of the species found in Mississippi have been recorded only from the northern and northeastern portions of the United States while others have not been known to occur farther east than Texas. Because of the differences in ecological conditions in the northern and southern United States and the effect of these factors on the development of species of Miridae, it is often difficult to recognize species collected in the south from keys and descriptions based upon specimens from the northern United States. Consequently it is hoped that this study will add something to our knowledge of this large and increasingly important family of hemipterous insects.

The writer is especially indebted and wishes to express his gratitude to Dr. H. H. Knight, under whose guidance this work has been done, for assistance in making determinations and for many valuable suggestions; also to Prof. R. W. Harned,

who suggested and encouraged the undertaking of this problem and enabled the writer to collect Miridae in the various sections of Mississippi.

Synoptic keys, descriptions, host plants, and distribution records are included for all the species of the family known to occur in Mississippi. In all cases descriptions and keys to species have been made with specimens for study either from Mississippi or from nearby states. Particular attention has been given to the ecological relationship of species of Miridae to their host plants, especially in regard to distribution. The life history and habits of two species with illustrations of the developmental stages are included.

GENERAL BIOLOGY OF MIRIDAE

Seasonal History

The members of the family Miridae are all terrestrial and live largely on growing plants, however, a few species are found on or beneath the bark of dead trees. A large majority of the species spend the winter in the egg stage and have but one generation during the season. The eggs are usually inserted into the tissues of the stems or leaves of the plant and remain dormant until the following spring. The eggs usually hatch about the time the leaf-buds begin to develop in the spring and the adults begin to emerge about the time the host plant begins to bloom. Some species, however, that spend the winter in the egg stage produce several generations during the season. A relatively small number of species hibernate during the winter as adults among dead grasses, under leaves or loose bark where they can find suitable protection. As is usual for Hemiptera, the species have five developmental stages. After reaching the adult stage there is often a general dispersal of individuals to many kinds of plants although they, no doubt, eventually return to favorite host plants for oviposition.

Feeding habits and economic importance

The feeding habits of the species of Miridae are exceedingly variable. Members of this family are found quite abundantly on most all types of vegetation where they obtain their food. The food plants include representatives of each of the four great divisions of the plant kingdom, from Thallophytes, the lowest, to Spermatophytes, the highest. Rarely do we find insects attacking indiscriminately so many plants with such widely different characteristics. A large majority of the species are phytophagus and feed wholly upon sap obtained from the tender, growing parts of plants. The feeding punctures often cause characteristic lesions or scars on the plants and the result is stunted or abnormal growth of the infested parts. Many species are wholly predaceous on small, soft-bodied insects, but other species are only partially predaceous, the blood of other insects only serving as a supplement to the food obtained from favorite host plants. Predaceous forms are usually found widely scattered on many kinds of plants, bark of tree trunks and similar places where they search for their prey.

The greater number of phytophagus species are generally restricted to a single host plant, or a group of closely related plants. However, a few species such as Lygus pratensis Linn., Lygus hesperus Knight, Psallus seriatus

Reuter, and Halticus citri Ashmead, are known to have a wide variety of host plants. The family contains thirty or more species that have been reported as doing more or less serious damage to cultivated crops, and many others that may be considered as potential pests.

Many species that may be considered as potential pests breed in enormous numbers on various wild host plants that are closely related to cultivated crops. Because of altered environments these species may change their host relationship and become pests at any time. There are several well known examples of mirids that have gone from unimportant cultivated crops and become serious pests within recent years. The cotton flea hopper (Psallus seriatus Reuter) has been present in Texas and other cotton-growing states for many years breeding on Croton and other wild host plants. In 1920 it was found doing rather serious damage to cotton along the coastal region of Texas and in 1926 was considered an important pest throughout most of the cotton belt. Lygus hesperus Knight has in recent years proven to be a serious pest of cotton and alfalfa in Arizona and southern California. The apple red bug (Lygidea mendax Reuter) is apparently native to species of Crataegus but has gone over to cultivated apples and in 1914 was reported as being among the most injurious pests of apples in western New York. The "suck fly" (Dicyphus minimus Uhler)

breeds on several species of wild solanaceous plants and in 1898 was reported as being a serious pest of tobacco in Florida. Within the last ten years this species has become a serious pest to tomatoes in Texas. The phlox plant bug (Lopidea davisi Knight) breeds abundantly on wild Phlox and has since 1923 been reported from many sections of eastern United States as a serious pest of cultivated Phlox. These are only a few of the more important species that have changed from wild host plants to cultivated crops within recent years.

BIOLOGY OF PLAGIOGNATHUS CARYAE KNIGHT AND ORTHOTYLUS RAMUS KNIGHT ON PECAN

Plagiognathus caryae Knight and Orthotylus ramus Knight are widely distributed throughout Mississippi breeding on pecan (Carya illinoensis) and hickory (Carya spp.). On pecan these species often occur in enormous numbers although less abundantly on hickory. Because of the enormous population of these species on pecan it was suspected that they were injurious to the early stages of the nuts and probably responsible for the shedding of numerous small nuts during the early spring. Consequently studies were begun in 1932 on the biologies of these species to determine the extent of injury, if any, to developing pecans. These studies were continued during the spring of 1933. This work was carried on at College Station, Texas, where weather conditions are very similar, during the spring months, to conditions in south Mississippi where most of the pecans are grown in that state.

Geographical distribution

No records are available concerning the occurrence of either Orthotylus ramus Knight or Plagiognathus caryae Knight on pecan east of Mississippi but both species have been recorded from New York on hickory. Both species are

very abundant on pecan in Texas, and Orthotylus ramus Knight has been received from Eagle Pass, Texas, where it was reported to be very abundant on pecan. No doubt both species will be found throughout the South and Southwest where pecans are extensively grown.

Seasonal history and habits

Both Plagiognathus caryae Knight and Orthotylus ramus Knight have but one generation during the season. Soon after oviposition the adults die and the eggs remain dormant until the following spring. The eggs are invariably inserted into the bark of the young shoots of the present year's growth, at the base of the leaf petioles. Several eggs, as many as ten, are laid in irregular groups either between the base of the leaf petiole and the secondary bud or occasionally between the primary and secondary buds. The eggs are inserted their entire length, with only the serrated cap extending above the surface. The eggs hatch the following spring at about the time the leaf buds and catkins or male flowers begin to develop, although the hatching period is often extended for several weeks depending largely on weather conditions. The nymphs feed largely if not entirely on the developing pollen grains of the catkins, and remain on the catkins at all times, unless disturbed, and then they run rapidly back to the stem and conceal themselves among

the bud-scales at the base of the catkins. In view of the fact that the catkins furnish an abundant food supply the nymphs feed but little on the pistillate flowers, or developing nuts. The nymphs have about the same developmental period as the catkins, reaching the adult stage at about the same time that the pollen ripens. The stragglers of the brood that must complete their maturity after the pollen has ripened feed to some extent on the young nuts.

There is some evidence that Plagiognathus caryae Knight is partially predaceous. On several occasions third and fourth instar nymphs were found in tunnels made by the larvae of the pecan nut case-bearer (Acrobasis caryae Grote) in the young pecan limbs and in all cases observed the larvae were absent. Whether the nymphs had gone into empty tunnels for protection, a seemingly unusual habit, or whether the nut case-bearer larva had previously been destroyed by the nymphs could not be determined. However, nymphs and larvae were caged together on pecan catkins and the larvae pupated apparently without being harmed by the nymphs.

Both the nymphs and adults of Plagiognathus caryae Knight will readily pierce the human skin, especially if the surface is moist with perspiration. The bite is quite painful although only of short duration.

Extent of Injury

Because of the fact that these insects feed largely on the catkins or male flowers and but little on the pistillate flowers or young nuts the damage in regard to nut production is negligible.

Life History of *Plagiognathus caryae* Knight

Hatching. Shortly before hatching the egg changed from a shining white to a dull yellowish color. The reddish eyes and more or less of the general outline of the nymph were plainly visible through the translucent chorion. During the hatching process the nymph pushed off the cap of the egg and by moving the body backward and forward gradually pushed the body outward until the head and legs were free. The legs were then utilized to complete emergence. After the nymph had emerged from the chorion it spent about one to two minutes grooming the antennae and rostrum with the front legs. In about three minutes after emergence the nymph was very active and able to run rapidly. The entire hatching process requires about fifteen to twenty minutes.

Molting process. While changing the food material in the rearing cages a second instar nymph was observed moving

about in an awkward, jerky, uneasy manner as though it had been injured. Closer observation revealed that the body was decidedly distended, the conjunctiva being considerably expanded. The head and thorax were moved up and down in a convulsive manner which continued for several minutes. The nymph then remained motionless for a moment, the thorax bulged and the exoskeleton split along the median line of the thorax. This split was not a sudden rupture but a gradual pulling apart. The head and antennae were then pulled from the exuvium and the legs and abdomen withdrawn simultaneously. The entire procedure was rather rapid, requiring not more than two minutes from the time the nymph became motionless until it was entirely free from the exuvium. The nymph crawled away immediately and was quite active.

Description of Developmental Stages

The egg (Pl. I, fig. 1). Length .92 mm., width .25 mm. The egg is almost cylindrical, being only slightly thicker on the middle and slightly curved. The apex of the cap is truncate or only slightly concave. The surface is smooth, glistening, grayish to whitish.

First instar nymph (Pl. I, fig. 2). Length .82 mm., width of head .34 mm., width of prothorax .33 mm., width of abdomen .32 mm. Color a nearly uniform dark green dis-

tinctly clouded with fuscous. Head yellowish green, eyes red; antennae rather short, stout, greenish, clothed with very fine, yellowish hairs. Thorax distinctly darkened with fuscous, the median line pale greenish. Dorsum sparsely clothed with short, stiff, erect hairs. Legs rather uniform, ashy gray, tarsi fuscous to black.

Second instar nymph (Pl. I, fig. 3). Length 1.1 mm., width of head .35 mm., width of prothorax .37 mm., width of abdomen .50 mm. Color a nearly uniform dark green with only a tinge of fuscous. Head a uniform yellowish green, eyes red; antennae uniform ashy gray. Thorax rather distinctly fuscous over a green background, median line and sutures between segments green. Clothed with stiff, erect, brownish hairs. Legs uniform ashy gray, tarsi black.

Third instar nymph (Pl. I, fig. 4). Length 1.6 mm., width of head .42 mm., width of prothorax .42 mm., width of abdomen .54 mm. General color dark green. Head greenish yellow, paler near eyes; eyes reddish; antennae a uniform fuscous gray, first segment fuscous at base. Thorax dark green, faint median line pale, wing pads beginning to show. Abdomen yellowish green, pubescence arranged in regular rows on each segment. Legs ashy gray, hind femora with two or three fuscous spines on dorsal surface, a fuscous spot at base of each, these spots are sometimes fused and extended as a fuscous line along the dorsal surface of femora;

tibial spines rather indistinct.

Fourth instar nymph (Pl. I, fig. 5). Length 1.97 mm., width of head .54 mm., width of prothorax .58 mm., width of abdomen .79 mm. A nearly uniform dark green color. Head yellowish green; antennae uniformly fuscous, first segment somewhat darker. Wing pads quite large, pale yellowish green. Legs ashy gray with distinct fuscous line on dorsal margin of hind femora; tibial spines black with a distinct black spot at base of each. Dorsum rather densely clothed with stiff fuscous to black hairs.

Fifth instar nymph (Pl. I, fig. 6). Length 2.5 mm., width of head .63 mm., width of prothorax .71 mm., width of abdomen 1.05 mm. Color a nearly uniform yellowish green. Antennae fuscous, darker at base of each segment. Wing pads reaching upon fourth abdominal segment. Legs and pubescence as in fourth instar.

Adult (Pl. I, fig. 7). Length 3.5 mm., width 1.4 mm. Head width .72 mm.; yellowish to yellowish-brown, tylus and lower half of front black. Rostrum reaching apex of middle coxae, yellowish, basal and apical segments black. Antennae chiefly yellowish; segment I black, pale at apex; II, yellow with a black band at base and somewhat dusky at apex; III and IV yellowish to dusky. Pronotum, length .62 mm., width at base 1.2 mm.; dark brown to black, central area of disk and calli more or less yellowish; mesoscutum black; scu-

tellum yellowish, the median line rather broadly brownish black. Hemelytra brownish to black, more or less broadly each side of claval vein and along radial vein, and base of cuneus, yellowish translucent, membrane fuscous, veins yellowish. Dorsum clothed with rather fine, pale golden, pubescence. Legs yellowish tinged with fuscous; femora with two rows of fuscous spots on dorsal surface, often fused on hind femora; tibial spines with black spot at base of each.

TABLE 1

Duration Nymphal Stages of Plagiognathus caryae Knight.

Specimen No.	Date Hatched	Date of First Molt	Date of Second Molt	Date of Third Molt	Date of Fourth Molt	Date of Fifth Molt	Total Days From Hatching to Adult
1	Apr. 8	Apr. 11	Apr. 14	Apr. 17	Apr. 20	Apr. 23	15
2	" 8	" 12	" 15	" 18	" 21	" 24	16
4	" 8	" 11	" 15	" 17	" 19	" 23	15
6	" 8	" 11	" 13	" 16	" 18	" 22	14
7	" 8	" 11	" 13	" 16	" 18	" 22	14
9	" 8	" 11	" 15	" 18	" 21	" 24	16
13	" 8	" 11	" 15	" 18	" 20	" 24	16
15	" 8	" 11	" 15	" 18	" 20	" 24	16
17	" 8	" 11	" 15	" 18	" 20	" 24	16
18	" 8	" 12	" 15	" 17	" 19	" 23	15
20	" 8	" 11	" 14	" 17	" 19	" 23	15
23	" 8	" 11	" 14	" 17	" 20	" 24	16
25	" 8	" 12	" 15	" 18	" 21	" 25	17
Average No. days for each instar		3.23	3.07	2.84	2.38	3.77	15.4

The life history of Plagiognathus caryae Knight under natural conditions is quite variable due to varying weather conditions. As a general rule the nymphs begin to emerge at College Station about April 1, but often may be as much as ten days earlier or later. The developmental data for thirteen specimens, which were reared successfully from the time of hatching to the adult stage, are summarized in Table 1. These specimens were reared in an unheated laboratory where the temperature and humidity was somewhat more uniform than would have been found under natural conditions. Under such conditions, as shown in Table 1, the entire nymphal development required an average of 15.4 days.

Life History of Orthotylus ramus Knight

Description of Developmental Stages

The egg (Pl. II, fig. 1). Length .89 mm., width .28 mm. The egg is decidedly clavate, and slightly curved with a short but distinct hook on one side of the cap. The surface is smooth, glistening, white.

First instar nymph (Pl. II, fig. 2). Length .80 mm., width of head .29 mm., width of prothorax .25 mm., width of abdomen .24 mm. Color a nearly uniform pale greenish yellow. Eyes dark red. Antennae uniformly pale fuscous green, slightly paler at the base of each segment, sparsely clothed

with short grayish to dusky hairs. Abdomen somewhat darker green; the third segment with a conspicuous orange-colored spot on dorsal surface. Legs uniformly pale greenish, tarsal claws fuscous.

Second instar nymph (Pl. II, fig. 3). Length 1.05 mm., width of head .35 mm., width of prothorax .33 mm., width of abdomen .38 mm. The coloration is almost identical with the first instar, being only slightly darker especially the greenish color.

Third instar nymph (Pl. II, fig. 4). Length 1.6 mm., width of head .63 mm., width of prothorax .69 mm., width of abdomen .84 mm. Color a nearly uniform dark green. Wing pads evident. Head yellowish green; antennae a uniform ashy gray. Third abdominal segment usually with an orange spot as in previous instars though it is sometimes absent. Legs ashy gray, coxae dark green, tarsal claws black.

Fourth instar nymph (Pl. II, fig. 5). Length 2.0 mm., width of head .67 mm., width of prothorax .75 mm., width of abdomen .85 mm. General color greenish yellow. Eyes gray. Head, thorax, wing pads, antennae and legs a nearly uniform pale greenish yellow. Tarsal claws fuscous. Abdomen dark greenish yellow, third segment often with rounded orange-yellow spot on dorsal surface. Dorsum sparsely clothed with long yellowish hairs.

Fifth instar nymph (Pl. II, fig. 6). Length 3.1 mm.,

width of head .75 mm., width of prothorax .84 mm., width of abdomen 1.1 mm. Color a nearly uniform pale green. Eyes gray. Antennae slightly dusky. Wing pads yellowish green. Third abdominal segment often with rounded orange-yellow spot. Legs dusky, tarsal claws black. Dorsum clothed with erect, yellowish pubescence.

Adult (Pl. II, fig. 7). Length 4.0 mm., width 1.5 mm. Head width .72 mm.; eyes small, rounded from behind. Rostrum reaching middle of intermediate coxae. Antennae yellowish green, last segment somewhat dusky. Pronotum, length .60 mm., width at base 1.1 mm. Coloration a uniform green or yellowish green, membrane pale, veins green. Dorsum clothed with simple pale yellowish pubescence, except the calli which are glabrous. Male genital claspers distinctive of the species; the dorsal margin of the genital segment with a strong spine projecting posteriorly.

TABLE 2

Duration Nymphal Stages of Orthotylus ramus Knight.

Specimen No.	Date Hatched	Date of First Molt	Date of Second Molt	Date of Third Molt	Date of Fourth Molt	Date of Fifth Molt	Total Days From Hatching to Adult
1	Apr. 8	Apr. 12	Apr. 15	Apr. 18	Apr. 20	Apr. 23	15
3	" 8	" 11	" 14	" 17	" 21	" 25	17
7	" 8	" 11	" 13	" 16	" 18	" 22	14
8	" 8	" 15	" 18	" 20	" 23	" 27	19
10	" 8	" 11	" 13	" 16	" 18	" 22	14
14	" 8	" 12	" 15	" 17	" 19	" 23	15
15	" 8	" 11	" 14	" 17	" 19	" 23	15
21	" 8	" 11	" 14	" 17	" 21	" 25	17
22	" 8	" 11	" 15	" 18	" 20	" 24	16
24	" 8	" 12	" 15	" 17	" 19	" 23	15
25	" 8	" 11	" 14	" 17	" 21	" 25	17
Average No. days for each instar		3.63	2.9	2.72	2.63	3.9	15.8

The life history of Orthotylus ramus Knight is very similar to that of Plagiognathus caryae Knight, although under natural conditions the adults begin to emerge a few days later than caryae. Life history studies were made at the same time and under identical conditions as P. caryae. The developmental data for eleven specimens, which were successfully reared from the time of hatching to the adult stage, are summarized in Table 2. As shown in the table, the entire nymphal development required an average of 15.8 days.

ECOLOGICAL CONSIDERATIONS

The native vegetation of any region indicates the kinds of insects one may expect to find there, and this is especially true of species of Miridae. Variations of soil, rainfall, and climate are reflected in the vegetation and this in turn by the insect fauna. Although Mirids are to a great extent rather independent of minor differences in climate, we find a large percentage of the species definitely linked with certain plant associations and many species definitely restricted to one species of plant or a group of closely related species, especially during their developmental period. It is also quite noticeable that certain species are, to a very great extent, restricted by variations in light, temperature, and humidity, even more than the host plants. Some species are almost invariably found along streams or in dense woodlands where the vegetation is rank and succulent and the humidity relatively high, while others are generally found in more exposed environments where the temperature is often extremely high and the humidity relatively low.

Although collecting has been done neither extensively nor intensively enough to form the basis for a comprehensive ecological study, the localities in which collections have been made are quite representative of the faunal regions of

the state. These data show some interesting relationships in regard to the distribution of species of Miridae and the type of flora of the different regions.

Life Zones

Almost all of Mississippi lies within what Merriam (U.S.D.A., Biol. Sur., Bul. 10, 1898) has designated as the Austroriparian Area of the Lower Austral Zone, though a small area in the northeastern part of the state lies in a transitional zone between this area and the Carolinian Area of the Upper Austral Zone. There are many species of plants and insects found in this transitional zone that properly belong to the Carolinian Area. A small area in the extreme southern part of the state lies within the Gulf Strip of the Lower Austral Zone.

The state lies within what Transeau (Amer. Nat., 39, 875-889, 1905) has designated as the Southeastern Conifer Forest which centers in the South Atlantic and Gulf Coastal Plains. This formation is composed of many associations, the pines, oaks, and hickories forming the principal dominants with oak-hickory associations forming the climax forest.

Climatic Factors

In general the summers are hot, the winters mild. The

mean July temperature is about 80° F., though temperatures of 100° F. or above sometimes occur. The mean temperature for January is about 47° F. Temperatures as low as 10° F. are uncommon though zero temperatures have been recorded almost throughout the state. The average growing season for the state is about seven months although it is about nine months along the coast. Rainfall is heavy during mid-winter and midsummer, averaging about 50 inches annually except along the coast where it is 60 inches annually. Some snow usually falls every winter, but remains on the ground for a short time only.

Topography

The surface of Mississippi presents considerable diversity in regard to elevation and character of the soil. The greatest elevation in the state, in the extreme northeastern part, is about 800 feet above sea level, while a narrow strip five to twenty-five miles wide bordering the Gulf is but a few feet above high tide. While this difference in elevation is perhaps not an important climatic factor, it undoubtedly has a decided effect upon plant distribution within the state.

The length of the state from north to south is a little more than 300 miles or about five degrees of latitude. This distance alone is not sufficient to produce a noticeable

difference between the flora of the northern and southern parts of the state, but when this factor is added to the ameliorating effect of the Gulf in the southern counties and the greater elevation in the northern counties, one would expect to find important floral differences such as exist. There are also soil differences which are perhaps largely responsible for this dissimilarity.

Soil Types and Floristic Areas

Mississippi is divided into ten more or less distinct geological regions, each representing a different soil type (Fig. 1). The soil types distinctly influence the distribution of plant species and may be used to represent the floristic regions of the state. These regions then may be considered as local or subordinate divisions within the Austroriparian Area, based principally upon soil differences. Although these regions form quite distinct floristic groups when the vegetation as a whole is considered, the area covered is sometimes small and considerable overlapping occurs forming transitional zones between larger and more distinct groups. Also, certain species of plants are very tolerant and readily adapt themselves to different environments, or may find suitable environments in restricted areas in any region and are thus distributed throughout the state. This is especially true of herbaceous species that are able

to establish and maintain themselves in much smaller areas than can trees and shrubs. For present purposes then the trees and shrubs are largely used for indicating the relationship of plant societies to soil types.

Relation of Distribution of Miridae to Floristic Regions

Since species of Miridae are generally restricted to a single species of host plant or group of closely related host plants, the distribution of the species may be rather definitely correlated with the distribution of host plants. Some species are apparently restricted to a definite floristic region because its host plant is restricted to that region. Others, however, are much more abundant in one floristic region than any others because its host plant is more abundant in that region. Then a species of Miridae may be considered typical of a given floristic region because of its abundance, even though it occasionally occurs in other regions.

It is not always possible to determine the host of a species collected. The presence of a specimen on a plant does not necessarily mean that it was breeding there or was even feeding at the time. However, if a number of specimens are collected on a plant, it does indicate that they were at least feeding there and the presence of nymphs on a plant is almost a certain indication that the species is breeding on that plant.

Species for which the host plants are known are here correlated with the distribution of the host plant in the floristic regions of the state.

Tennessee River Hills

As may be seen from the map (Fig. 1), this region covers a narrow strip in the extreme northeastern corner of the state. The area is composed of high steep hills and ridges, the highest elevation being about 800 feet above sea level. This was originally a plateau forming the southern end of the Appalachian fold. The soil is light, sandy, and rather infertile except along the streams.

The hills and steeper slopes of this region are still largely covered with forests, although most of the large timber has been removed. The most abundant trees on the hills are loblolly pine, Pinus taeda, and short-leaf yellow pine, Pinus echinata, often found in pure stands. Mixed with these, and especially on the lower slopes, are several species of oaks, black jack, Quercus marylandica, post oak, Q. stellata, white oak, Q. alba, and Spanish oak, Q. veluntina. On rocky slopes are found chestnut oak, Q. prinus, red oak, Q. rubra, butternut, Juglans cinerea, and black walnut, J. nigra. Scrub pine, Pinus virginiana, is sometimes found on the high rocky hills in the northern part of this region.

Some of the common shrubs found on the upland slopes are several species of Vaccinium, hazelnut, Corylus americana, mountain laurel, Kalmia latifolia, and hop hornbean, Ostrya virginiana.

Among the numerous herbaceous species found on the upland slopes, only a few are of interest here. Two species of Phlox, pilosa and reptans, are quite abundant and on the more fertile slopes nettleleaf sage, Salvia urticifolia, is sometimes found.

Several species of Miridae seem to be more or less typical of this region. Pinus taeda supports a varied group of species including Phytocoris pinicola Knight, P. uniformis Knight, Ceratocapsus barbatus Knight, Pilophorus vanduzeii Knight, and Alepidia gracilis (Uhler). Plagiognathus punctatipes Knight is known to breed only on black walnut, Juglans nigra, and was found on that host in this region only. Coccobaphes sanguinareus Uhler breeds on Acer rubrum. On Salix nigra, Paracalocoris salicis Knight was found abundantly in this region, Lopidea minor Knight breeds on Phlox pilosa and Macrolophus separatus Knight and M. longicornis Knight breed on Salvia urticifolia. Neither of these latter species were found in any other region of the state.

Northeastern Prairie Belt

This region was originally typical prairie, with only

scattered patches of trees except along streams where there were heavy growths of timber. This region is now largely in cultivation but some timber remains along the streams. Within recent years some areas formerly in cultivation have been thrown out and there is a tendency for these to grow up in trees, usually old field pine and shrubby oaks.

The characteristic soil of the prairies is a dark, heavy, calcareous, loamy clay. In much of the region, however, a lighter, yellowish brown loam prevails. This soil is less fertile than the typical prairie soil and usually supports a growth of trees, principally oak.

The typical prairie soil is devoid of trees except for scattered groups of crab apple, Malus angustifolia, hackberry, Celtis mississippiensis, and red cedar, Juniperus virginiana, with deciduous holly, Ilex decidua, and honey locust, Gleditsia triacanthos, on the lower slopes.

On the open prairies are found many characteristic and showy species of herbaceous plants which are not of interest here.

On the higher, lighter and less fertile soil areas which dot the prairies like islands, an entirely different group of plants occur. These areas support a rather dwarfed growth of trees consisting chiefly of oaks. The most common of these are post oak, Quercus stellata, black jack, Q. marylandica, Spanish oak, Q. velutina, Q. durandi, hickory,

Carya alba, persimmon, Diospyros virginiana, blue ash, Fraxinus quadrangulata, and several species of Crataegus.

The soil along stream bottoms is generally fertile, rather heavy and contains considerable lime, thus supporting a rather abundant growth of trees. The most common of these are, Quercus alba, velutina and nigra, Carya alba, Gleditsia triacanthos, Liriodendron tulipifera, Platanus occidentalis, Negundo aceroides, Fraxinus americana, Acer saccharum, A. dasycarpum, Cornus asperiofolium, Ulmus fulva, Aesculus glabra, and Cercis candensis.

Red cedar, Juniperus virginiana, supports a rather varied group of species including Dichrooscytus tinctipennis Knight and D. viridicans Knight, Pilophorus juniperi Knight and Parthenicus juniperi (Heid.). All of these species are apparently restricted to this plant, at least in this state. On Ilex decidua, Plagiognathus geminatus Knight was found abundantly. This represents the most northerly record of this species. Orthotylus chlorionis (Say) occurs very commonly on Gleditsia triacanthos throughout this region. Quercus stellata is the only known host plant of Neocapsus cuneatus Dist. and it has been taken only in this region of the state. Plagiognathus nigrolineatus Knight is also abundant on this plant in this region and occurs quite often in other regions of the state. Diospyros virginiana is the host of Plagiognathus carinatus Knight which is very abundant

here. Fraxinus quadrangulata supports two species of Neoborus, tricolor Van D. and vittiscutis Knight, which were found only in this region. Heterocordylus malinus Reuter was found only in this region on Crataegus sp. Platanus occidentalis is the only known host of Plagiognathus albatus Van D., and P. cornicola Knight occurs abundantly on Cornus asperifolia.

Pontotoc Ridge

As may be seen from the map (Fig. 1) this is a very narrow belt covering a small area in the northern part of the state. As its name implies, it consists of a broad high ridge that is severely eroded into high hills with intervening valleys of small streams.

The soil of this region is rather fertile, red sandy loam and supports an abundant growth of plants. The plants of this region are decidedly different from those of the prairies on the east and the Flatwoods on the west. However, the flora shows a close affiliation with the Tennessee River Hills region and an undoubted northern affinity. Even though the floristics of these two regions are decidedly different, for present purposes they may be considered the same. Species of Miridae collected in this region were also taken on the same plants in the Tennessee River Hills.

Flatwoods

This region presents a low lying, flat topography, though in certain parts it becomes rolling or even hilly. The characteristic feature, however, is flatness.

The soil is a heavy, tenacious, dark gray clay. The drainage is poor so that, except in dry years, the soil is cold, wet, and more or less acid. The close texture of the heavy clay soil and the poor drainage are such that it is either too wet for plant growth, or when dry, too hard and compact. Plants supported by such a soil must be able to withstand extreme alternate conditions of an infertile, water-logged, acid soil, and a dry soil of stony hardness.

These conditions are reflected in the poor growth of trees and shrubs which are chiefly loblolly and short-leaf yellow pine, and a few species of oaks, such as black jack, post oak, and Spanish oak. These form open, barren forests with here and there scattered growths of several species of Crataegus. The soil and topographic features of the Flatwoods merge with those of the North Central Plateau on the west so the floristic features merge also, and will not be further considered here.

Only one species of Miridae has been found in this region that is worthy of mention here. Melanotrichus catulus (Van D.) was found breeding on Gnaphalium sp. grow-

ing in an open post oak woods. This species was found in this region only.

North Central Plateau

This region is much larger than any of those considered so far, covering about one-third of the entire state. The surface is that of a maturely eroded plateau of varying altitudes from less than 400 feet to more than 600 feet, the higher altitudes being in the northern part of the area. Because of the mature erosion the area consists of broad hills and ridges with rather broad valleys along the many large streams. Often two or more terraces fringe the stream valleys. The first bottoms are often poorly drained and form extensive swamp areas and occasionally small peat bogs.

The upland soils of this region consist principally of yellow and red sandy loams. Along the eastern edge, however, the soil is similar to that of the Flatwoods though somewhat more sandy and much better drained. Along the western edge there is considerable extension, at least in some places, of a yellowish-brown silt loam from the Loess Bluff area. These soils are fairly rich in plant food although usually deficient in lime. Soils of the river valleys are quite fertile, sandy loams but are also somewhat deficient in lime.

The flora of this region is quite varied and over most

of the area makes a rather vigorous growth. The principal tree growth is pine, Pinus taeda and echinata being the most common species. Usually they do not form pure pine forests here, but have a considerable mixture of several species of oaks and other hardwood trees. The oaks most commonly found with the pines are post oak, Quercus stellata, black jack, Q. marylandica, and Spanish oak, Q. velutina. Other hardwoods commonly found are American elm, Ulmus americana, Sassafras officinale, Carya tomentosa, Diospyros virginiana, and Cornus florida.

Several species of Miridae are commonly found associated with these upland communities. On Quercus stellata, Deraeocoris davisi Knight, and D. sayi Reuter were taken only in this region, and Plagiognathus nigrolineatus Knight was found abundantly. Pilophorus laetus Van D. was taken on Pinus taeda only in this region. Plagiognathus carinatus Knight breeds on Diospyros virginiana in this region.

The lowland vegetation of this region consists principally of hardwoods of many species, such as, Quercus nigra, Q. alba, Q. michauxii, Q. lyrata, Acer dasycarpum, A. rubrum, Ilex opaca, Carpinus caroliniana, Platanus occidentalis, Ulmus americana, U. fulva, Fraxinus americana, Fagus ferruginea, Carya alba, Liriodendron tulipifera, Liquidambar stryraciflua, Nyssa sylvatica, N. acquatica, and Alnus serrulata. Taxodium distichum is also quite common.

A large number of species of Miridae are found in this area, many of which are more or less restricted to such an environment. Diaphnidia pellucida Uhler, Reuteria irrorata Say and Lygus geneseensis Knight are found breeding on Quercus alba; on Nyssa sylvatica are found Lygus nyssae Knight and L. semivittatus Knight. Fraxinus americana, when growing in cool, shaded places, supports several species, as Neoborus glaber Knight, N. canadensis Van D., N. rufusculus Knight and Xenoborus neglectus Knight. These species are apparently restricted to cool, shaded places since they were not found on trees growing in open environments. Psallus alnicenatus Knight was found breeding on Alnus serrulatus growing along the sandy banks of streams and Plagiognathus annulatus Uhler was found rather abundant on Carpinus caroliniana. Smilax rotundifolia is the only known host of Paracalocoris johnstoni Knight, and Lopidea davisi Knight breeds abundantly on Phlox divaricata.

Jackson Prairie Belt

This region, as may be seen from the map (Fig. 1), extends in a narrow belt almost across the state. The typical prairie soil is a rather heavy dark calcareous soil which does not extend over the entire area but is generally found in patches that are surrounded by sandy soils similar to the adjacent regions.

The flora in part is a typical prairie flora but is intermixed with vegetation from surrounding areas so that it will not be discussed here.

Loess Bluff Region

This region covers a narrow strip bordering the eastern edge of the Mississippi Delta lowlands from the northern boundary of the state to and beyond the Louisiana state line on the south. From Vicksburg south the bluffs lie very close to the river, and are more pronounced than farther north. The region consists of precipitous hills and narrow deep valleys produced by the deep cutting of small streams in passing from the plateau level to that of the delta lowlands.

The soil of this region is formed from a thick deposit of calcareous silt which overlies the surface to a depth of 30 feet to 75 feet. This soil is a uniformly fine, yellowish, calcareous silt and because of the lime content is quite fertile.

The vegetation of this region is abundant and varied and although it is principally of hill type, many species that are typical of the adjacent delta lowlands are found in the deep valleys.

The tree growth of the region is almost entirely of hardwoods, pines being rarely found except as second growth

in thrown out fields. Red cedar is not uncommon but it, too, probably represents an invasion onto the barren slopes. Several lime-loving species that are common in the lime soils of northeast Mississippi are commonly found here. Some of the more common trees of the hill forests are: Quercus alba, velutina, texana, durandi, michauxii, and nigra, Carya alba and myristicaeformis, Juglans nigra and cinerea, Fagus ferruginea, Celtis mississippiensis, Tilia pubescens, Magnolia grandiflora, acuminata, and macrophylla, Ostrya virginica, Carpinus caroliniana, Robinia pseudo-acacia, Ulmus americana and fulva.

The flora of the lowlands of this region present only slight differences from the adjacent delta region and will be mentioned only briefly here. Among the more common are several species of lowland oaks, Magnolia grandiflora and acuminata, Nyssa sylvatica and acquatica, Liquidambar styraciflua, Taxodium distichum, Fraxinus americana and quadrangulata, Fagus ferruginea, Ilex opaca, Acer dasycarpum, Populus deltoides, and Salix nigra.

There are but few species of Miridae that seem to be typical of this area. On shield fern, Aspidium thelypteris, Monalocoris falicis Linn. breeds abundantly while Strongylocoris stratus (Uhler) is equally abundant on Solidago sp. (probably caesia). Robinia pseudo-acacia is the host of Lopidea robiniae (Uhler) and Orthotylus robiniae Johnston.

On *Salix nigra*, *Plagiognathus tinctus* Knight and *Lygidea obscura* Reuter were found only in this region.

Yazoo-Mississippi Delta

This region includes the low-lying alluvial lands bordering the Mississippi river and the lower courses of its tributaries. In southern Mississippi it forms only a narrow strip but north of Vicksburg it widens to form a broad, nearly level plain 60 miles wide at its widest point and about 200 miles long. Drainage is rather poor and much of the area frequently overflows and is permanently covered with bayous, lakes, and swamps.

The soil is very fertile and supports a luxuriant swamp vegetation. The flora of this region differs from other swamp areas of the state quantitatively rather than qualitatively. No species occur here that would not be found in other swamp areas near by, but the forest growth runs to a few dominant species. On the higher, better drained soils the lowland oaks form the principal dominants with a mixture of ash, hickory, pecan, beech, hackberry, and magnolia. There is comparatively little undergrowth except along the banks of lakes and streams. In the low poorly drained areas the tree growth is predominantly a forest of swamp species, principally gums, *Nyssa sylvatica* and *acquatica*, *Liquidambar styraciflua*, cypress, *Taxodium distichum*, and willow, *Salix*

nigra along the banks of streams, bayous, and lakes.

There are no species of Miridae that seem to be restricted to this area but there are several species, found also in swamp areas of other regions, that are very abundant here. On cypress, Taxodium distichum, were found Phytocoris taxodii Knight, Ceratocapsus taxodii Knight and C. complicatus Knight. Salix nigra is the host of Pilophorus australis Knight, Ceratocapsus fuscinus Knight, Orthotylus viridis Van D., O. ornatus Van D., and O. modestus Van D. Barberiella apicalis Knight was taken only in this area but could not be associated with any particular host.

Long Leaf Pine Region

As may be seen from the map (Fig. 1) this region includes all of the state south of the Jackson Prairie Belt and east of the Loess Bluff Region except for the very narrow Gulf Coastal Strip. The region as a whole is gently rolling but becomes rather hilly in the northern portion.

The soil is a reddish-brown sandy loam and is on the whole much less fertile than any of the regions already considered. It is generally poor in plant food elements and does not retain moisture very long. In the southern portion, however, the low swales and flats between ridges are poorly drained, acid soils. The water-logged condition causes an acidity simulating a northern bog and the flora is also very

suggestive of a bog flora.

The upland forests of this region were once almost pure stands of long leaf pine, Pinus paulustris, which constituted about 90 per cent of all tree growth in the region. However, most of these trees have now been cut for commercial purposes and with the forest fires that usually followed, extensive areas have been left almost bare of trees. In addition to the long leaf pine some of the drier less fertile slopes, and especially in the northern part of the region, support a rather shrubby growth of Pinus taeda and echinata, Quercus cinerea, nigra, and catesbaei, Sassafras officinale, Diospyros virginiana, and Cornus florida.

On stream bottoms and near edges of marsh areas the flora is abundant and varied. Some of the more common species are: Quercus nigra, phellos, and virginiana, Nyssa sylvatica and acquatica, Liquidambar styraciflua, Pinus taeda and glabra, Taxodium distichum, Rhododendron viscosum and nudiflorum, Ilex opaca and vomitoria, Magnolia glauca, grandiflora, and macrophylla, Fagus ferruginea, Chionanthus virginica, Fraxinus caroliniana, Betula nigra, Hypericum densiflorum, Ascyrum stans and pumilum, and Vitis vulpina. Pecan Carya illinoensis occurs throughout this region, both wild and cultivated, but is probably not a native. Tillandsia usneoides is abundant especially in the southern portion of this region.

The species of Miridae found in this region are both numerous and varied. Although some of them are found occasionally in other regions many of them are apparently restricted to this region. Betula nigra is the host of three species taken only in this region. These are Phytocoris puella Reuter, Deraeocoris cuneatus Knight, and Plagiognathus similis furvus Knight. The only known host of Phytocoris rufus Van D., found only in this region, is Ascyrum stans. Plagiognathus ilicis Knight breeds on Ilex opaca and Plagiognathus geminatus Knight is extremely abundant on Ilex vomitoria. Nyssa sylvatica supports several species, including Lygus semivittatus Knight and nyssae Knight, Lepidopsallus nyssae Johnston, and Plagiognathus albatus vittiscutis Knight. Phytocoris conspersipes Reuter breeds on Pinus glabra, Pseudoxenetus regalis scutellatus Uhler on Quercus cinerea, Diaphnidia capitata Van D. on Fagus ferruginea, Orthotylus taxodii Knight on Taxodium distichum, Diaphnidia bella (Van D.) on Vitis vulpina, and Rhinocapsus miniatus Knight on Rhododendron viscosum. Orthotylus ramus Knight and Plagiognathus caryae Knight breed abundantly on both wild and cultivated pecans.

Coastal Pine Meadows

This region covers a narrow strip bordering the Gulf of Mexico, varying in width from five to twenty-five miles,

and is nowhere more than thirty feet above sea level. Ground water lies near the surface and comes to the surface in occasional depressions forming rather extensive marshes and swamps. Near the coast are sand ridges which indicate the position of former beach dunes now covered with vegetation in various stages of successional development.

The soil is sandy and in the low, wet meadows is black, peaty, and acid. The drier parts of this whole area were, until recently, covered with an open growth of pine. The pines have now been removed leaving flat barren meadows. On the wet acid soils occurs an undergrowth similar to that of northern bogs. The floristics of this region is perhaps the most interesting in the state, possessing more species peculiar to itself than any other. Among these are several species of pitcher plants, Sarracenia spp., sundews, Drosera spp., and club mosses, Lycopodium spp.

Some of the more common trees and shrubs found on the drier areas and bordering the swamps are: Pinus paulustris and taeda, Quercus virginiana, laurifolia, catesbaei, nigra, and cinerea, Magnolia grandiflora and glauca, Osmanthus americana, Nyssa sylvatica and acquatica, Rhododendron viscosum and nudiflorum, Ilex glabra and vomitoria, Myrica cerifera, and along the beach Daubentonia longifolia. Spanish moss, Tillandsia usneoides is abundant everywhere in this region.

Several species of Miridae are apparently restricted

to this region. On Osmanthus americana is found Neoborus osmanthicola Johnston, and Lygus fasciatus olivaceous Reuter breeds on Myrica cerifera and Cephalanthus occidentalis. Quercus virginiana supports two species, Psallus guttulosus Reuter and Lepidopsallus miniatus Knight, both of which are very abundant. Tillandsia usneoides is the only known host of Phytocoris tillandsiae Johnston. Along the beach Creontiades debilis Van D. is found on Daubentonia longifolia.

THE FAMILY MIRIDAE

The family Miridae is distinguished from other hemipterous families by having four-segmented rostrum with the first segment as long or longer than the head, ocelli absent, three-segmented tarsi, rarely two-segmented, wing membrane usually with two cells or areoles, sometimes with only one, one longitudinal vein (anal vein), and a well developed cuneus in the wing. The antennae are usually slender, more or less linear, segment II slightly thickened apically, rarely incrassated, III and IV, usually slender but sometimes distinctly thickened. The hemelytra consist typically of clavus, corium, embolium, cuneus, and membrane, the embolium is usually not distinctly separated from the corium. Brachypterous and apterous forms are not uncommon. The male is usually macropterous even when the female is apterous but in rare cases the male is also apterous.

Species of Miridae are small to medium in size and usually rather fragile. The bodies are usually more or less elongate, the female usually more robust than the male. Most species have a rather conspicuous covering of fine hairs or pubescence, often modified to form sericeous, or scale-like, deciduous pubescence, although many species are practically glabrous. Color patterns are variable and usually the male is darker in color than the female. In

many of the more highly specialized genera the male genitalia furnish excellent characters for distinguishing the species.

Dr. Knight recognizes nine subfamilies which are based largely upon the arolia and male genitalia. Each of the subfamilies is represented in Mississippi. The phylogenetic development of these subfamilies does not represent a linear series but development has taken place in several directions.

This paper includes 189 species of Miridae actually recorded from Mississippi and three other species recorded from very near the boundary in Alabama. There are at least eight other species whose known distribution is such that they no doubt occur within the state, making a total of at least 200 species. This number will, no doubt, be considerably increased when more intensive collecting has been done throughout the year. It is quite interesting to note that New York has 306 recorded species, and Dr. Knight has recognized approximately 290 species from Illinois. Watson recorded 189 species from Ohio which probably is not a complete list for that state.

Key to Subfamilies of Miridae.

(Adapted from Knight, Hemiptera of Connecticut 1923).

1. Arolia present, erect and prominent; or pseudarolia very prominent, usually with bristle-like arolia also present 6

Arolia absent, or present but bristle-like in form, sometimes difficult to distinguish from hairs on tarsus; pseudarolia absent, or present but small in size 2

2. Prothorax simple, destitute of an apical stricture, sometimes with a flattened apical area suggesting a collar but not separated off by a distinct incised line; male genitalia distinctive, the tip of the penis twisting to the left, lying closely within the bend of left clasper, extending downward and beyond it to the left side . . . . Phylinae

Prothorax provided with an apical stricture, sometimes fine and shallow, when apparent only at the sides an impressed line extends back to rear of calli; male genitalia not as above 3

3. Claws thick, either sharply bent, or broadly curved, or more sharply curved and cleft near base 4

Claws simple and slender, rarely widely spread; tibiae weakly spinose, long and tapering apically

or else greatly shortened; in the latter case segment I of the tarsi is unusually long, the head transverse and eyes strongly protruding. . . Cylapinae

4. Pronotum with annuliform apical stricture 5

Pronotum with an apical gibbosely convex area; stricture apparent only at the sides from which an impressed line extends to the rear of the calli . . . . . Clivineminae

5. Hemelytra hyaline, glassy, ovate, with a sharply defined inverted Y-shaped red or fuscous mark (Hyaliodes) . . . . . Dicyphinae (Part)

Hemelytra not hyaline or glassy; claws usually cleft near base, arolia bristle-like but pseudarolia absent . . . . . Deraeocorinae

6. Pseudarolia very prominent, obscure bristle-like arolia also present between claws at base 7

Arolia prominent, always arising approximate at base between the claws, never connate with them but sometimes minute pseudarolia are also apparent on the inner curve of the claw; free, more or less linear, converging or diverging at the apices 9

7. Ultimate tarsal segment incrassate, always thicker than the preceding; pseudarolia broadly involving the claws; tibiae destitute of spines; lora confluent with genae . . . . . Bryocorinae

Ultimate tarsal segment linear; pseudarolia not as above; lora usually distinctly separated from the genae 8

8. Prothorax simple, without annuliform apical stricture, certain forms with a somewhat flattened apical collar but in such case the abdomen is constricted at base and the claws curved only at extreme tips; male genitalia distinctive, tip of the penis twisting to the left, lying closely within bend of left clasper, extending downward and beyond it to the left side . . . . . Phylinae

Prothorax with annuliform apical stricture, sometimes obsolete above in the middle but forming a distinct collar; claws usually sharply bent; male genitalia not as the above . . . . . Dicyphinae

9. Arolia diverging at their apices 10

Arolia convering at their apices . . . . Orthotylinae

10. Prothorax without ring-like apical constriction, often with sulcus impressed near front margin of calli but never extending over the sides; lateral margins of disk usually carinate to anterior angles; first tarsal segment much longer than second and equal in thickness; tarsal segments scarcely overlapping at joints and thus very flexible (straw-climbers) . . . . . Mirinae

Prothorax with a ring-like apical constriction which extends over the sides and beneath, sometimes obsolete on median line above, and more rarely it may be entirely absent but in such case the abdomen is constricted at base; lateral margins of disk frequently carinate but never extending forward upon collar; first tarsal segment short, rarely longer than second except in the Resthenini, but when longer, the pronotal collar very distinct and segment I much thicker than segment II; tarsal segments with tips overlapping at joints and thus practically inflexible (leaf-walkers) . . . Capsinae

Subfamily Phylinae.

This subfamily is divided into three tribes by Knight (1923), only one of which is represented in Mississippi.

Tribe Phylini.

Key to Genera. (Adapted from Knight 1923).

1. Pubescence normal, composed of a single type of fine, chiefly erect pubescent hair, sometimes nearly glabrous 2

Pubescence composed of closely appressed, tomentose or scale-like deciduous hairs, and usually intermixed with more erect pubescent hairs 7

2. Head more or less produced, facial angle (when viewed from the side, the angle formed by the contour line of the tylus and the lower margin of the buccula) less than a right angle; length of antennal segment II greater than the width of head 4

Head not or scarcely produced, facial angle forming a right angle or practically so; length of antennal segment II not or scarcely exceeding width of head 3

3. Antennal segment II strongly thickened and flattened in the male, distinctly thickened toward apex in female . . . . . Leucopoecila

Antennal segment II linear or practically so . . . . . Chlamydatus

4. Tibiae and tibial spines pale; small species measuring 2 - 3 mm. in length . . . . . Sthenarus

Tibiae chiefly pale, tibial spines dark, sometimes the tibial spines pale but then the entire body is pale and measures 3.5 mm. or more in length 5

5. Tibiae pale, spines dark but without dark spot at base 6

Tibiae chiefly pale, spines dark with dark spot at base, at least on basal half of tibiae, or if not, then the dorsum and tibial spines also pale . . . . . Plagiognathus

6. Antennal segment II incrassated, at least equal in thickness to segment I; color chiefly reddish but hemelytra and venter darkened with fuscous . . . . . Rhinocapsus

Antennal segment II more slender, never equal to thickness of segment I; body chiefly blackish but sometimes with pale . . . . . Microphylellus

7. Pseudarolia attached only at base of claw, tips free and extending to middle of claw; greenish yellow species with fuscous markings on the hemelytra . . . . . Reuteroscopus

Pseudarolia minute or wanting, connate and not extending free for a space greater than the base of attachment 8

8. Antennae short, length of segment II not equal to width of head; short ovate forms, clothed with closely appressed scale-like deciduous hairs and intermixed with erect pubescent hairs; tibiae black, strongly spinose . . . . . Lepidopsallus

Antennae longer, length of segment II equal to or greater than width of head; pubescence variable but always composed of two types of hairs; tibiae dark but more often pale and spotted with darker .. 9

9. Head broad, eyes large, width across eyes greater than three-fourths the width of pronotum at base;

pseudarolia absent; left genital clasper with a small spine at base of dorsal margin which points in a line parallel with margin of genital segment; right clasper small, little longer than broad . . . . . Megalopsallus

Head not so broad, width not equal to three-fourths the width of pronotum at base, usually not equal to more than two-thirds the width of pronotum at base . . . . . Psallus

Genus Chlamydatus Curtis, 1833.

Small oblong-oval species, with head short, subvertical, but little broader than apex of pronotum; eyes large, widely separated, in contact with anterior angles of pronotum, vertex convex, obtusely margined at base; rostrum reaching or surpassing intermediate coxae; pronotum convex, declivent, at least twice as wide at base as long; scutellum triangular, equilateral; hind femora stout, saltatorial. Two species are known from Mississippi.

Key to Species.

Front and middle femora entirely pale, hind femora black . . . . . associatus

Femora fuscous to black . . . . . suavis

Chlamydatus associatus (Uhler).

Heyden's Survey Terr., Rept. for 1871, 419, 1872.

Length 2.6 mm., width 1.05 mm.; fuscous to black, front and middle legs, hind tibiae, and first two segments of tarsi pale yellowish; antennal segments III and IV sometimes pale fuscous; clothed with fine, pale yellow, suberect pubescence. Sexes similar, female slightly more robust.

Breeds on ragweed (Ambrosia spp.).

Carthage, June 6, 1926, (H. G. Johnston).

Chlamydatus suavis Reuter.

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 92, 1876.

Length 2.1 mm., width .92 mm.; fuscous to black, tibiae and sometimes basal half of antennal segment II, and segments III and IV yellowish; clothed with fine, pale yellow, suberect pubescence. Sexes similar, female more robust.

Breeds on ragweed (Ambrosia spp.).

Smithdale, Sept. 2, Tylertown, Sept. 8, 1924, (H. M. Harris); Natchez, May 15, 1931, (H. G. Johnston).

Genus Plagiognathus Fieber, 1858.

Rather small, oblong-oval, somewhat shining species, with head more or less produced so that facial angle is less than a right angle; antennae slender, segment II

longer than width of head; rostrum reaching or surpassing hind coxae; pronotum strongly declivent, its sides rounded, not carinate, calli low but distinct; femora usually marked with fuscous lines or spots, tibiae usually pale, spines dark with black spot at base of each, or if not, then the dorsum and tibial spines also pale; clothed with a single type of rather fine, chiefly erect pubescent hairs. A large genus with 13 species and two varieties known from Mississippi.

Key to Species.

1. Tibial spines dark and with a black spot at base of each, sometimes obsolete apically 4

   Tibial spines pale, without a black spot at base of each, general color pale greenish yellow to yellowish brown, rather dark brown in the male of <u>geminatus</u> 2

2. Antennal segment I with two black lines, and a slender black line on basal half of segment II; femora with a black line apically on dorsal and ventral margins . . . . . <u>nigrolineatus</u>

   Antennae and femora without black lines 3

3. Length of antennal segment II greater than length of rostrum; female pale greenish yellow, scutellum

and femora distinctly infuscated; male dark brown to fuscous, pronotum, scutellum and hind femora darkest, basal margin of cuneus pale . . . *geminatus*

Length of antennal segment II not equal to length of rostrum; general color yellow to fusco-brownish, scutellum somewhat infuscated but legs rather uniformly yellowish . . . . . *ilicis*

4. Antennal segment II dark fuscous to black, sometimes pale on the middle but always more black than pale 5

Antennal segment II chiefly pale, blackish only at base 8

5. Cuneus uniformly black like the corium 7

Cuneus distinctly pale at base 6

6. Femora black except extreme apices pale; pubescence white . . . . . *politus*

Femora yellowish, hind femora somewhat infuscated and with two rows of prominent black spots on anterior face; pubescence yellowish . . . . . *similis* variety *furvus*

7. Rostrum and legs chiefly yellowish, hind femora with four or five black spots on dorsal surface, usually a black line forming on dorsal and ventral surface of apical half . . . . . *annulatus*

Rostrum and legs black, femora pale on extreme tips,

tibiae pale but with prominent black spots; deep black, strongly shining, pubescence white . . . . . nigronitens

8. Scutellum and usually the whole dorsum as well black 9

Scutellum pale or fulvous, sometimes dark brownish, frequently the median line blackish but the basal angles distinctly paler; hemelytra more or less pale, in darkest forms brownish black but always somewhat translucent 12

9. Hemelytra uniformly black, or blackish with pale . 10

Hemelytra reddish brown, cuneus distinctly reddish . . . . . tinctus

10. Length of second antennal segment in male equal to width of head across eyes plus the width of vertex and in female greater than width of head across eyes plus dorsal width of an eye . . . . . carinatus

Length of second antennal segment in male distinctly less than width of head across eyes plus width of vertex and in female less than width of head across eyes plus dorsal width of an eye 11

11. Cuneus uniformly black like the corium; left clasper forming an incurved acuminate claw; length 3.6-3.8 mm. . . . . punctatipes

Cuneus narrowly pale at base; left clasper with dorsal angle distinctly impressed and anterior margin carinate; length 3.2-3.4 mm. . . . . dispar

12. Antennal segment II black at base 13

Antennal segment II uniformly pale, sometimes narrowly dusky at base, segment I black; scutellum and cuneus pale . . . . . albatus

(a) Scutellum and cuneus wholly pale . . . . . variety albatus typ.

(b) Median line of scutellum and apical half of cuneus blackish . . . . . variety vittiscutis

13. Scutellum with median line blackish, pale or fulvous on each side 15

Scutellum uniformly colored, or with median line paler than basal angles 14

14. Femora pale or fulvous, distinctly spotted in linear series with black; scutellum uniformly pale or with median line pale and basal angles dark; rosy pink or fulvous and tinged with dark brown . . . . . delicatus

Femora rather uniformly dark except apices, black spots indistinct; scutellum uniformly dark fusco-brownish, similar to whole dorsum . . . cornicola

15. Dorsum clothed with rather prominent, long, coarse, pale yellow, simple pubescence; hemelytra rather

uniformly pale fuscous, apical half of embolium pale translucent . . . . . (pale form) carinatus

Dorsum clothed with very fine, golden, simple pubescence; hemelytra with inner half of clavus and apical half of corium, except sometimes along radial vein, dark fuscous to brown . . . . . carvae

Plagiognathus politus Uhler.

Col. Agr. Expt. Sta., Bul. 31, Tech. Ser., No. 1, 52, 1895.

Length 3.5 mm., width 1.2 mm.; oblong-ovate, shining black or dark brown, vertex and lunule at base of cuneus pale; femora black, apices pale, tibiae yellowish, knees, spines and spot at base of each, black; antennae black, segments III and IV yellowish to fuscous; rostrum reaching upon or slightly surpassing hind coxae; clothed with rather coarse, white or yellowish, simple pubescence. Sexes similar, female slightly more robust than male.

This species is quite variable in size, color and feeding habits. Found on Ambrosia sp., Aster sp., Solidago sp., and Solanum tuberosum.

Natchez, May 15, 1931; Columbus, June 20, Starkville, June 13, 1929, (H. G. Johnston).

Plagiognathus nigronitens Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 435, 1923.

Length 2.6 mm., width 1.1 mm.; shining black, vertex scarcely paler, cuneus uniformly black; rostrum scarcely attaining posterior margins of intermediate coxae; antennae black, extreme tip of segment II, and segments III and IV pale; hemelytra uniformly black, shining, the cuneus not at all paler than corium; clothed with pale yellowish pubescence; legs black, femora pale at apex, tibiae pale yellowish, hind pair becoming infuscated on basal third, tarsi pale apical segment black. Female similar to male in color and pubescence.

Swept from grassy ridges in rather open woods. Not previously recorded south of Virginia.

Wiggins, April 25, Corinth, May 25, Booneville, May 25, 1931, (H. G. Johnston).

Plagiognathus tinctus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 437, 1923.

Length 3.5 mm., width 1.35 mm.; yellowish to reddish brown, pronotum and scutellum fuscous, cuneus distinctly red; rostrum reaching upon or slightly surpassing hind coxae, yellow, apex brown; antennae yellowish, segment I black, pale only at apex, II black only at base; hemelytra yellowish to reddish brown, darker on apical half of corium, cuneus distinctly red, paler at base, membrane fuscous, veins pale; clothed with yellow pubescence; legs yellow to reddish brown,

femora with two rows of prominent black spots on anterior face, sometimes obsolete on anterior femora; venter dark brown, shining. Sexes similar but female frequently paler, basal half of pronotum and apex of scutellum often yellowish.

Breeds on black willow (Salix nigra). Described by Blatchley as P. debilis (Het. E. N. Amer., 941, 1926). Not recorded south of North Carolina.

Natchez, May 15, 1931, (H. G. Johnston).

Plagiognathus carinatus Knight.

Ent. News, xxxvii, 10, 1926.

Length 4.2 mm., width 1.6 mm.; brownish to black; head black, vertex yellowish; antennae pale, segment I black, pale only at apex, II, yellow, black only at base, III and IV, pale yellow; rostrum attaining posterior margin of intermediate coxae, yellow on middle, dark brown at base and apex; pronotum black, often pale on basal half, scutellum black sometimes pale on basal angles; hemelytra dark brown to black, often paler on embolium, along radial vein and claval suture, base of cuneus somewhat translucent but not distinctly pale; femora pale to yellow with a double row of black spots on anterior face, hind femora often fuscous on apical half; left genital clasper of male carinate; dorsum clothed with simple, golden yellow pubescence. Sexes similar although

female often paler.

Breeds on persimmon (Diospyros virginiana L.).

Recorded only from Virginia and Maryland. In the original description Dr. Knight states that antennal segment II is brownish to black, black at base, and also states that some specimens have antennal segment II more yellow than black. The latter seems to be the normal condition in Mississippi. In a series of 38 specimens the second antennal segment is distinctly yellow and narrowly black at base. There is but little evidence of any variation toward brown or black although the dorsum is quite variable in color. In most specimens the dorsum is dark brown to black while others are broadly pale fuscous. In the palest specimens, only the head, lateral margins of pronotum, mesoscutum, and median line of scutellum are dark fuscous to black.

Natchez, May 15, Booneville, May 26, 1931, (H. G. Johnston).

Plagiognathus annulatus Uhler.

Colorado Agr. Expt. Sta., Bul. 31, Tech. Ser., No. 1, 51, 1895.

Length 3.9 mm., width 1.4 mm.; yellowish brown to black, shining; head black, vertex often pale; antennae black, apical third of segment II and segments III and IV often pale

to yellow; rostrum attaining posterior margins of hind coxae, yellow to reddish brown; legs pale to yellowish, basal half of coxae, knees, spots and spines on tibiae, apical segment of tarsi, four or five spots on anterior face of femora and usually a dorsal and ventral line, black, femora sometimes shaded with brown; dorsum uniformly brownish to black clothed with golden yellow pubescence. Female slightly more robust than male.

This is a widely distributed, variable species, found breeding on ironwood (Carpinus caroliniana).

Wiggins, May 5, Columbia, May 12, Natchez, May 15, Water Valley, May 22, Grenada, May 20, Oxford, May 22, Pontotoc, May 27, Carthage, May 2, Tchula, May 18, 1931, (H. C. Johnston).

Plagiognathus nigrolineatus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 443, 1923.

Length 3.9 mm., width 1.4 mm.; uniformly pale greenish fading to yellowish; head pale, apex of tylus black, antennae pale, segment I with two black lines on dorsal surface, inner one sometimes obsolete, II with slender black line on anterior surface extending from base to near middle, often reduced to an elongate spot at base; rostrum reaching to middle of hind coxae; legs pale, a single spot on anterior face of femora and spot on knee black, often a slender line on dorsal and

postero-ventral surface near apex of hind femora, black; dorsum uniformly pale green to yellowish green with fuscous spot on anal area of membrane and in smaller areole, clothed with rather fine, pale yellow, simple pubescence. Sexes similar in size and coloration.

This species is easily recognized by the pale green color and black lines on antennae. Found rather sparingly in Mississippi breeding on post oak (Quercus stellata), although it has been found in Texas in enormous numbers on the same host.

Holly Springs, May 23, A. and M. College, May 29, (light trap) Crawford, April 29, Carthage, May 2, 1931, (H. G. Johnston).

Plagiognathus ilicis Knight.

Ent. News, xxxvi, 305, 1925.

Length 3.3 mm., width 1.5 mm.; yellowish to greenish yellow fading to yellowish brown; head short, strongly declivent, greenish yellow; antennae yellow, segments III and IV, darker; rostrum scarcely attaining posterior margins of intermediate coxae; legs uniformly pale yellowish, hind femora rather obscurely dotted with pale fuscous spots, claws brown; dorsum rather uniformly yellowish brown, scutellum somewhat darker, embolium paler, cuneus yellowish translucent, membrane uniformly pale fusco-

brownish; clothed with simple, yellow to brown pubescence. Sexes similar, female more robust and lighter in color, uniformly yellowish, hemelytra paler and translucent.

Found breeding on holly (Ilex opaca) only in cool, shaded areas. This species is recorded only from near Ithaca, New York, the type locality, where it was found abundantly on Ilex verticillata.

Lyman, April 18, Wiggins, May 5, 1931, (H. G. Johnston).

Plagiognathus geminatus Knight.

Ent. News xl, 265, 1929.

Male. Length 3.4 mm., width 1.4 mm. Head: width .77 mm., vertex .31 mm.; uniformly yellowish to dull brown. Rostrum, length .92 mm., reaching to middle of intermediate coxae, yellowish, apex brown. Antennae: segment I, length .21 mm.; II, 1.15 mm.; III, .38 mm.; IV, .32 mm.; yellowish, last two segments slightly darker. Pronotum: length .67 mm.; width at base 1.22 mm.

Dull brown to dark brown; basal angles of pronotum, clavus, and corium sometimes paler, base of cuneus yellowish translucent, membrane dark brown, veins somewhat paler; clothed with golden yellow, simple pubescence which becomes dark brown on disk of pronotum and cuneus; legs yellow to brownish, femora darker, hind femora much darker, a single row of small black spots along median line of an-

terior surface, tibiae pale, spines brownish, often a pale brown spot at base of each spine; venter yellowish brown, sternum and genital segment darker, genital segment with a distinct carina on apical two-thirds of ventral surface.

Female. Length 3.5 mm., width 1.6 mm.; pale greenish yellow, disk of scutellum fuscous, legs infuscated, femora darker, hind femora much darker, a row of dark brown spots along median line on anterior surface; clothed with pale yellowish pubescence.

Breeds on Ilex vomitoria and I. decidua. Closely related to P. ilicis Knight which breeds on Ilex opaca. The male is here described for the first time, geminatus having been described from the female. The sexes are very different in general appearance, especially in color, and might readily be mistaken for different species. This species has been recorded only from College Station, Texas, the type locality.

Mississippi City, April 11, Landon, April 15, Biloxi, April 16, Meridian, April 28, A. and M. College, May 2, 1931, (H. G. Johnston).

Plagiognathus albatus (Van Duzee).

Pomona Jl. Ent. Zool. vii, 116, 1915.

Length 3.8 mm., width 1.4 mm.; yellowish white marked with black; head yellowish, tylus black; antennae yellowish,

segment I black, narrowly pale at base and apex, segment II sometimes fuscous on basal third; pronotum with lateral and basal margins of disk, and pleura more or less broadly, brownish to black; inner half of clavus and more or less broadly on apical third of corium brown to black; membrane pale with a distinct fuscous spot along margin beyond the apex of cuneus, sometimes entirely fuscous; sternum and venter brown to black; legs pale, hind femora with a group of black spots on apical half and often a subdorsal row extending onto basal half, tibiae pale, spines black, spots at base of spines often indistinct. Female more broadly pale than male.

Breeds on sycamore (Platanus occidentalis). This species is quite variable in color, especially the extent of the black markings.

A. and M. College, May 15, 1926; Tchula, May 18, Pontotoc, May 27, 1931, (H. G. Johnston).

Plagiognathus albatus vittiscutis Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 445, 1923.

Similar to albatus but having the median line of scutellum and apical half of cuneus, black; black areas usually more extensive than in albatus.

Found in Mississippi and Texas, breeding on sour gum (Nyssa sylvatica). Recorded from New York on butternut

(Juglans cinerea).

Wiggins, May 5, A. and M. College, May 29, 1931, (Light trap), (H. G. Johnston).

Plagiognathus similis furvus Knight.

Proc. Biol. Soc. Wash., xl, 12, 1927.

Length 4.2 mm., width 1.4 mm.; uniformly dark brown to black; vertex, base of cuneus and veins of membrane pale to yellowish; antennal segments I and II, black, apical half of II often dark reddish brown, III and IV, yellowish; rostrum reaching apex of hind coxae, yellow, apex reddish brown; legs yellowish, hind femora fuscous with two rows of distinct black spots on outer surface; dorsum clothed with rather coarse yellowish pubescence. Sexes similar in size and coloration.

Breeds on birch (Betula nigra). Recorded only from Maryland and North Carolina.

Columbia, May 12, 1931, (H. G. Johnston); Wiggins, May 29, 1931, (J. P. Kislanko).

Plagiognathus delicatus (Uhler).

Ent. Amer., iii, 34, 1887.

Length 3.2 mm., width 1.3 mm.; reddish yellow to brownish; head, yellowish brown, front fuscous each side of median line; antennae yellowish, segment I fuscous; rostrum scarcely reaching apex of intermediate coxae; pronotum reddish yellow,

calli, especially the posterior margins, fuscous; scutellum yellowish, usually with basal angles fuscous; hemelytra shaded with fuscous, inner basal angle of cuneus pale, veins pale; legs pale, front and intermediate femora with a single row, hind femora with two distinct rows of brown spots; clothed with rather fine golden yellow pubescence.

This species has not been found in Mississippi but was described from Georgia and taken at College Station, Texas, thus it no doubt occurs within the state. Breeds on honey locust (Gleditsia triacanthos).

Plagiognathus caryae Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 448, 1923.

Length 3.5 mm., width 1.34 mm.; yellowish to fulvous with dark brown to black markings; antennal segment I brown to fuscous, basal third polished, shining; rostrum scarcely reaching apex of intermediate coxae; pronotum dark brown to fuscous, central area of disk and calli pale to yellowish; scutellum yellowish; mesoscutum and rather broadly on median line of scutellum brownish to black; hemelytra brownish black, more or less broadly each side of claval vein, bordering radial vein from base to apex, inner angle and base of cuneus, and usually basal half of embolium, pale translucent to yellowish, membrane fuscous, sometimes paler on middle,

spot near apex of cuneus pale, veins yellow; legs yellow, femora with two rows of dark brown to black dots on anterior face, larger and darker on hind femora, sometimes obsolete on front and intermediate femora; clothed with rather fine golden yellow pubescence. Sexes are similar, female slightly more robust and pronotum often more broadly pale.

Breeds in enormous numbers on pecan (Carya illinoensis), and rather sparingly on hickory (Carya spp.), where it feeds largely on the developing catkins.

Found throughout the state where pecan or hickory is found, April to June.

Plagiognathus cornicola Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 450, 1923.

Length 3.4 mm., width 1.3 mm.; brownish to fuscous, vertex pale; antennal segment I black, apex pale, II, brownish to fuscous, black at base, sometimes entirely black; pronotum fusco-brownish to fuscous, calli sometimes darker, scutellum uniformly brownish to fuscous; hemelytra fusco-brownish, somewhat translucent, cuneus uniformly colored as the corium, membrane fuscous, veins pale, a clear spot near apex of cuneus; legs brownish to black, apices of femora pale, tibiae pale with rather prominent black spot at base of spines; clothed with fine pale yellowish pubescence. Sexes similar in color and pubescence.

Breeds abundantly on dogwood (Cornus asperifolia). Not recorded south of Virginia.

Tupelo, May 26, Pontotoc, May 27, A. and M. College, May 29, 1931, (H. G. Johnston).

Plagiognathus punctatipes Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 450, 1923.

Length 3.7 mm., width 1.4 mm.; black, vertex, antennae and legs pale; rostrum scarcely surpassing apex of intermediate coxae, pale, darker at base and apex; antennal segment I black, pale at apex, II, yellow, narrowly black at base, III and IV, yellowish; pronotum black, shining, mesoscutum paler; hemelytra uniformly black, shining, somewhat translucent, membrane fuscous, veins slightly paler; legs pale yellowish, hind femora with two rows of prominent black spots on anterior face, tibiae with knees brown, spots at base of spines small, becoming obsolete apically, tarsi fuscous; clothed with rather coarse, pale yellowish pubescence. Sexes very similar in size, color and pubescence.

Breeds on black walnut (Juglans nigra). Not recorded south of Virginia.

A. and M. College, May 1, Booneville, May 26, 1931, (H. G. Johnston).

Plagiognathus dispar Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 451, 1923.

Length 3.4 mm., width 1.2 mm.; black, vertex, antennae, legs, and narrowly on base of cuneus pale; rostrum slightly surpassing middle of posterior coxae, pale, darker at base and apex; antennal segment I black, narrowly pale at apex, II, yellow, narrowly black near base, III and IV, yellow; pronotum and scutellum black, shining, mesoscutum paler on lateral angles; hemelytra black, shining, somewhat translucent, base of cuneus yellowish, translucent, membrane pale fuscous, spot near apex of cuneus and veins paler; legs yellowish, posterior coxae fuscous, apex pale, hind femora with twelve fuscous spots forming two rows on anterior face, a group of five or six spots on posterior face near apex, fuscous spots at base of tibial spines very small; clothed with very fine, pale yellowish pubescence. Sexes similar, female slightly more robust.

Found sparingly on hickory (Carya) where it apparently breeds. Not recorded south of Illinois and Maryland.

Corinth, May 25, 1931, (H. G. Johnston).

Genus Microphylellus Reuter, 1909.

Small, elongate-oval species, with head more or less produced, strongly declivent; rostrum at least attaining apex of middle coxae; antennae slender, segment I distinctly surpassing apex of tylus, II, never attaining thickness of

segment I; legs chiefly pale, femora often with fuscous dots, tibiae pale, spines dark but without black spot at base; body chiefly black but sometimes with pale markings, clothed with simple, chiefly erect pubescence. Two species are known from Mississippi.

Key to Species.

Hemelytra uniformly blackish . . . . . modestus

Hemelytra more or less pale; embolium, cuneus, and basal half of corium pale or yellowish; scutellum pale but with median line blackish . . . . . maculipennis

Microphylellus modestus Reuter.

Ofv. Finska Vet. - Soc. Forh., liv, Afd. A. No. 7, 62, 1912.

Length 3.3 mm., width 1.3 mm.; brownish black, vertex paler; antennae yellowish, segment I brownish at base sometimes rather broadly so; rostrum reaching apex of posterior coxae, yellowish, apex brown; legs yellow, tarsi somewhat brownish, femora often with three or four fuscous dots on anterior face; hemelytra uniformly brownish black, membrane fuscous, slightly paler at apex of cuneus, veins paler; clothed with pale yellowish pubescence. Female very similar to male in color and pubescence.

Found on elm (Ulmus), post oak (Quercus stellata),

hickory (Carya sp.), black locust (Robinia pseudo-acacia), and ironwood (Carpinus caroliniana), where it is apparently predaceous, at least to some extent. Not recorded south of North Carolina except from Texas.

Grenada, May 20, Water Valley, May 12, Holly Springs, May 23, A. and M. College, May 29 (trap light), Corinth, May 25, Tupelo, May 26, Pontotoc, May 27, Carthage, May 2, Natchez, May 15, 1931, (H. G. Johnston).

Microphylellus maculipennis Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 456, 1923.

Length 3.3 mm., width 1.2 mm.; brownish black with rather extensive yellowish markings; head brownish, vertex pale; rostrum reaching hind margins of intermediate coxae, yellow, apex brownish; antennae yellowish, segment I brownish at base, sometimes wholly brown, II, yellow, sometimes brownish at base and apex, III and IV, somewhat dusky; pronotum brownish, central area of disk and basal angles pale to yellowish, scutellum pale to yellowish, median line rather broadly brown; hemelytra brownish to black, embolium, basal half of corium, more or less on outer basal angles of clavus, and cuneus, pale to yellow, sometimes red, membrane fuscous, veins somewhat paler; legs pale to yellowish, basal half of posterior coxae and tarsi fuscous; clothed with fine yellowish pubescence. Sexes similar, female slightly more robust.

Breeds on hickory (Carya sp.) and white oak (Quercus alba). Recorded only from New York, Minnesota, and Texas.

Water Valley, May 12, Holly Springs, May 23, 1931, (H. G. Johnston).

Genus Sthenarus Fieber, 1858.

Elongate-oval species, clothed only with simple pubescence; head short, broader across eyes than long, strongly declivent, vertex strongly convex, feebly carinate; pronotum short, twice as broad across base as long, tylus broad, depressed; antennae slender, segment I not or scarcely surpassing tylus; rostrum reaching or surpassing apex of intermediate coxae; tibiae pale, spines without dark spot at base.

Key to Species.

Body bright red; legs and antennae pale . . . . mcateei

Body, legs, and antennae pale yellowish to brownish . . . . . viticola

Sthenarus mcateei Knight.

Proc. Biol. Soc. Wash., xl, 9, 1927.

Female. Length 3.0 mm., width 1.5 mm.; uniformly bright red, sometimes pale red; rostrum slightly surpassing posterior coxae, bright red, paler on apical half; antennae and legs including tibial spines pale yellowish;

membrane pale to dusky, veins red; clothed with rather coarse, simple, yellowish pubescence. The male is unknown.

Described from Maryland and Mississippi and known only from the type localities. Taken on wild grape (Vitis sp.).

Carthage, June 12, 1926, (H. G. Johnston).

Sthenarus viticola Johnston.

Bul. Brook. Ent. Soc.,xxx, 16, 1935.

Length 2.5 mm., width 1.1 mm.; uniformly pale yellowish to brownish; rostrum reaching posterior margin of intermediate coxae, yellow, apex brown; membrane dusky, veins somewhat paler; clothed with simple, rather coarse, yellow to golden pubescence. Sexes similar.

Breeds on wild grape (Vitis sp.) and is known only from Mississippi.

Natchez, May 15, Corinth, May 25, 1931, (H. G. Johnston).

Genus Rhinocapsus Uhler, 1890.

Elongate-oval, shining species; head elongate, strongly declivent, vertex shining, slightly convex, tylus long, prominent, strongly convex; antennae stout, segment II incrassate, at least equal in thickness to segment I, segments III and IV, slender; coastal margin of hemelytra broadly curved, cuneus with outer basal angle obtuse forming a distinct notch; pubescence composed of simple,

chiefly erect pubescent hairs.

Rhinocapsus miniatus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 460, 1923.

Length 3.7 mm., width 1.5 mm.; a nearly uniform bright red, antennal segment II and hemelytra darker; antennal segment II distinctly longer than width of pronotum at base, uniformly dark fusco-reddish, segments III and IV, pale to fuscous; rostrum reaching to middle of posterior coxae; hemelytra uniformly darker red than head and pronotum, membrane and veins uniformly fuscous, sometimes with reddish tinge; legs red, tibiae pale red to yellowish. Sexes similar.

Breeds on white swamp honey-suckle (Rhododendron viscosum). Definitely recorded only from Lakehurst, N. J., the type locality.

Poplarville, May 11, Tylertown, May 12, 1931, (H. G. Johnston); Wiggins, May 29, 1931, (J. P. Kislanko).

Genus Leucopoecila Reuter, 1907.

Small, oblong-oval, shining species, with head short, broad, nearly vertical; eyes large, overlapping anterior angles of pronotum; pronotum short and broad, more than twice as wide as long, basal margin broadly sinuate, leaving mesoscutum broadly exposed; membrane long and narrow, sur-

passing apex of abdomen; hind femora stout, hind tibiae long and slender. One species is known.

Leucopoecila albofasciata Reuter.

Ofv. Finska Vet.-Soc. Forh., xlix, No. 5, 26, 1907.

Male. Length 2.5 mm., width 1.0 mm.; black, shining, hemelytra marked with broad pale transverse band; head black, shining, vertex finely, densely punctate, opaque; antennal segments I and II strongly incrassate, II, compressed, broadly and deeply grooved on inner surface, III and IV, slender; rostrum reaching apex of posterior coxae, pale; pronotum and hemelytra dark brown to black, pale fascia extending across middle of clavus onto inner margin of corium, corium and cuneus bordering cuneal fracture, pale; membrane pale to fuscous; sparsely clothed with yellow to golden, suberect pubescence.

Female. Length 2.6 mm., width 1.09 mm.; similar to male in color and pubescence; somewhat more robust; antennae more slender, and segment II without groove on inner surface.

Breeds on a prostrate species of Euphorbia growing in open fields.

Charleston, Sept. 10, 1925, (H. M. Harris); Natchez, May 15, 1931, (H. G. Johnston).

Genus Reuteroscopus Kirkaldy, 1905.

Small, elongate-oval, species with head elongate, distinctly produced in front of eyes, vertex convex, not carinate; antennae slender in both sexes; rostrum attaining or surpassing posterior coxae; pubescence composed of recumbent scale-like hairs and suberect pubescent hairs.

Key to Species.

Tibial spines dark without spot at base; hemelytra with distinct fuscous cross . . . . . ornatus

Tibial spines dark with distinct spot at base; hemelytra without distinct fuscous cross . . . . . sulphureus

Reuteroscopus ornatus (Reuter).

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 90, 1876.

Length 3.3 mm., width 1.2 mm.; greenish yellow, pronotum often with dark green; scutellum, clavus, membrane, and a broad bar across apex of corium fuscous, forming a distinct cross; legs yellowish, tibial spines dark, without a spot at base; clothed with silvery scale-like pubescence, intermixed with brown pubescent hairs.

Breeds on ragweed (Ambrosia sp.). A widely distributed species which varies considerably in size but quite constant

in color markings. Silvery scale-like pubescence easily rubbed off.

Carthage, June 8, 1927; Catchings, June 29, Yazoo City, July 27, Rolling Fork, July 23, Natchez, July 31, Meadville, Aug. 1, Newton, Aug. 15, Union, Aug. 16, Kosciusko, Aug. 19, 1929, (H. G. Johnston).

Reuteroscopus sulphureus (Reuter).

Ofv. Finska Vet. - Soc. Forh., xlix, No. 5, 23, 1907.

Length 3.2 mm., width 1.1 mm.; yellow, often greenish yellow; apex of clavus, inner apical angle of corium, anal area of membrane, and spot on inner margin of cuneus, brown to fuscous; clothed with simple, yellowish to brown, suberect pubescent hairs, each with brownish spot at base; also with small scattered tufts of silvery, scale-like pubescence; membrane pale, conspurcate with brown or fuscous; legs yellow, femora thickly specked with small, pale, fuscous spots, tibiae pale, spines dark with dark spots at base. Female quite similar to male in coloration and pubescence.

Breeds on ragweed (Ambrosia sp.).

Wiggins, May 29, 1931 (J. P. Kislanko); West Point, June 19, Vicksburg, July 27, Yazoo City, July 27, Natchez, July 31, Laurel, Aug. 14, Newton, Aug. 15, 1929, Carthage, Aug. 25, 1928, (H. G. Johnston).

Genus Psallus Fieber, 1858.

Elongate-oval, subparallel species, with head short, broad, strongly declivent, vertex feebly convex, not carinate at base; eyes large, coarsely faceted; antennae slender, segment II equal to or longer than width of head; rostrum reaching or surpassing apex of intermediate coxae; tibiae usually pale with dark spots at base of spines; pubescence variable but composed of two types of hairs.

Key to Species.

1. Femora pale with numerous dark spots 2
   Femora black, sometimes pale on extreme tips 4
2. Antennal segment II pale and marked with five or six black spots, some of which form narrow annulations . . . . . seriatus
   Antennal segment II uniformly yellowish brown . . . 3
3. Rostrum scarcely surpassing apex of posterior coxae . . . . . guttulosus
   Rostrum reaching upon sixth ventral segment . . . balli
4. Head black, vertex yellowish brown; length 3.7-4.5 mm. . . . . alnicenatus
   Head uniformly black, vertex not yellowish; length 2.9-3.1 mm. . . . . astericola

Psallus alnicenatus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 466, 1923.

Length 4.3 mm., width 1.3 mm.; uniformly fuscous to black, vertex and antennal segments III and IV, paler; basal half of pronotum and hemelytra scarcely paler; membrane fuscous, veins paler at apex of areoles; legs fuscous to black, apex of coxae, trochanter, apex of femora, and tibiae, yellow, tibial spines black with black spot at base; osteolar peritreme pale yellowish; clothed with white pubescent hairs and sericeous, almost scale-like hairs, the latter most conspicuous on the pronotum and propleura. Female shorter and more robust than male, and antennal segment II with broad yellowish band on apical half.

Found breeding on alder (Alnus serrulata). These specimens are decidedly darker in color than specimens described by Dr. Knight from Northeastern America breeding on Alnus incana.

Oxford, May 22, 1931, (H. G. Johnston).

Psallus seriatus (Reuter).

Ofv. Sv. Vet. - Akad. Forh., xxxii, No. 9, 91, 1876.

Length 2.5 mm., width 1.05 mm.; pale greenish-yellow, often yellowish brown, thickly marked with minute brown spots; antennae pale yellowish, segments I and II with large fuscous spots on dorsal surface, II, equal to thickness of

I in male, more slender in female; hemelytra pale translucent, inner basal margin of cuneus with large brown spot bearing a tuft of brown, bristle-like hairs, membrane pale fumate, darker near apex, a distinct fuscous spot at apex of cuneus; clothed with simple, coarse, brown, pubescent hairs with a minute brown spot at base of each, intermixed with small, scattered tufts of silvery, deciduous, scale-like pubescence; legs yellow, femora thickly specked with many brown dots, tibial spines black, with black spot at base. Female slightly larger, more robust, and antennal segment II more slender than male.

This is the cotton flea hopper, a widely distributed species which breeds on cotton, several species of Croton, horse mint (Monarda spp.), evening primrose (Oenothera spp.), and many others.

Found throughout the state from April until November.

Psallus asterícola Knight.

Can. Ent., lxii, 125, 1930.

Length 3.0 mm., width 1.0 mm.; uniformly black; antennal segments III and IV yellowish to dusky; rostrum reaching posterior margins of intermediate coxae; legs black, apex of coxae and tibiae pale, tibial spines black, with black spot at base, tarsi pale, apical segment black; membrane fuscous, veins paler at apex of areoles; clothed

with silvery scale-like pubescence, intermixed with simple fuscous hairs. Female slightly more robust than male and with antennal segment II more or less pale on apical half.

Recorded only from Ames, Iowa, the type locality, where it breeds on Aster sericeus. The host was not located in Mississippi.

Corinth, May 25, 1931, (H. G. Johnston).

Psallus guttulosus Reuter.

Ofv. Sv. Vet. - Akad. Forh., xxxii, No. 9, 89, 1876.

Length 3.6 mm., width 1.5 mm.; dull yellowish, thickly speckled with reddish to fuscous dots, sometimes distinctly fuscous on pronotum and apical half of hemelytra; antennae uniformly yellow, segments III and IV slightly dusky; rostrum reaching apex of posterior coxae; legs pale, femora thickly speckled with fuscous dots, tibial spines brown with brown spot at base; cuneus reddish to fuscous, pale translucent at base; clothed with rather coarse, yellow hairs, and intermixed with rather inconspicuous, scale-like hairs. Female slightly more robust than male, antennal segment II more slender.

Breeds on oak (Quercus nigra).

Landon, April 15, Biloxi, April 16, Mississippi City, April 11, Long Beach, April 18, Lucedale, April 24, Meridian, April 28, Wiggins, May 5, 1931, (H. G. Johnston).

Psallus balli Knight.

Can. Ent., lviii, 253, 1926.

The following description is adapted from the original: Length 3.5 mm., width 1.4 mm.; pale yellow to orange, more reddish on pronotum, scutellum, and cuneus; antennae yellowish brown, scarcely darker apically; rostrum reaching sixth ventral; clavus infuscated on apical half; cuneus reddish, outer margin and apex yellowish; membrane fuscous, central and apical area conspurcate with fine, irregular white dots; legs yellowish to orange, femora with minute fuscous spots, tibial spines black, a fuscous spot at base; clothed with yellowish to golden brown, simple pubescence, and intermixed with silvery, sericeous pubescence. Sexes similar.

One specimen, a paratype, collected by H. M. Harris at Charleston, Aug. 31, 1925. Known elsewhere only from Florida.

Genus Megalopsallus Knight, 1927.

Oblong-oval species having head short, broad, strongly declivent, width of head distinctly greater than length of pronotum; length of pronotum equal to less than half the width at base; arolia bristle-like, claws broadly curved, without distinct notch at inner side of base, pseudarolia absent; rostrum long, reaching or surpassing hind coxae;

clothed with closely matted, sericeous, deciduous hairs, and intermixed with more erect, simple, pubescent hairs.

Megalopsallus latifrons diversipes Knight.

Ann. Ent. Soc. Amer., xx, 226, 1927.

Length 3.5 mm., width 1.4 mm.; pale reddish yellow; antennae yellow, length of segment II almost equal to width of pronotum at base; width of pronotum at base slightly greater than twice its length, scutellum with rather inconspicuous, pale median line; rostrum reaching upon fifth ventral segment; femora more or less reddish on apical half; membrane whitish, veins pale to yellowish; clothed with silvery, sericeous pubescence, and intermixed with fuscous, simple pubescence. Female slightly more robust than male.

Recorded only from Biloxi, the type locality, June 14, 1917, (H. H. Knight). Taken at light.

Genus Lepidopsallus Knight, 1923.

Short ovate forms having head short, broad, almost vertical; antennae short, length of segment II not equal to width of head; tibiae strongly spinose; claws strongly curved, arolia bristle-like, pseudarolia small, closely attached to inner margin of claws; clothed with recumbent, scale-like, deciduous pubescence, and intermixed with more erect, simple pubescence.

Key to Species.

1. Rostrum extending beyond posterior coxae . . . olseni
   Rostrum not extending beyond posterior coxae . . . 2
2. Rostrum scarcely attaining apex of intermediate coxae; color pale brown to fuscous, never reddish . . . . . nyssae
   Rostrum reaching upon middle of posterior coxae; color reddish to reddish brown, sometimes quite dark but cuneus and veins at least reddish . . . . . miniatus

Lepidopsallus miniatus Knight.

Bul. Brook. Ent. Soc., xx, 226, 1925.

Length 2.9 mm., width 1.5 mm.; reddish to reddish brown, pronotum and scutellum often dark fuscous; antennae pale yellowish, segments III and IV scarcely darker; rostrum reaching upon middle of posterior coxae; hemelytra reddish brown, cuneus a brighter translucent red, membrane dark brown, veins reddish; legs reddish to reddish brown, apices of femora, and tibiae pale yellowish, tibial spines dark with black spots at base; clothed with silvery white, scale-like pubescence. Female slightly more robust than male, coloration and pubescence similar.

Breeds on oak (Quercus virginiana, Q. nigra, and Q. stellata).

Landon, April 15, Biloxi, April 16, Crawford, April 29, Carthage, May 2, A. and M. College, May 29, 1931, (H. G. Johnston).

Lepidopsallus nyssae Johnston.

Bul. Brook. Ent. Soc., xxv, 299, 1930.

Length 3.0 mm., width 1.5 mm.; yellowish brown to fuscous; head, pronotum and scutellum fuscous to black; antennae pale yellowish, two apical segments scarcely darker; rostrum attaining apex of intermediate coxae; hemelytra yellowish brown, sometimes fuscous, membrane fuscous, veins scarcely paler; legs fuscous to black, sometimes pale yellowish, apices of femora, and tibiae pale, tibial spines dark with dark spots at bases; clothed with silvery, scale-like pubescence and intermixed with yellowish to fuscous, simple pubescence. Female more robust and paler in color than male, often pale yellowish brown except head and anterior portion of pronotum.

Breeds on sour gum (Nyssa sylvatica). Recorded only from College Station, Texas, the type locality.

Carthage, May 2, Wiggins, May 5, Corinth, May 25, 1931, (H. G. Johnston).

Lepidopsallus olseni Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 473, 1923.

Length 2.6 mm., width 1.1 mm.; uniformly reddish brown

to fuscous; antennae fuscous, segment II equal to length of pronotum plus dorsal width of an eye; rostrum extending upon the sixth ventral abdominal segment; legs reddish brown, tibiae and tarsi fuscous; clothed with silvery, scale-like pubescence and intermixed with more erect, pale, simple pubescence. Female slightly more robust than male.

Olseni was described from a single female with the "rostrum (imbedded in glue)", and consequently was placed by Dr. Knight in his key to the species of Lepidopsallus (Conn. Geol. and Nat. Hist. Survey, Bul. 34, 470, 1923), and followed by Blatchley (Heteroptera Eastern N. Amer., 952, 1926), in a group of species with the rostrum not extending beyond the posterior coxae. The rostrum distinctly reaches upon the sixth ventral segment of the abdomen.

Breeds on pine (Pinus sp.). Recorded only from Massachusetts and Maryland.

Tchula, May 18, 1931, (H. G. Johnston).

Subfamily Dicyphinae

Key to Genera. (After Knight 1923).

1. Pseudarolia prominent 2

   Pseudarolia absent; hemelytra hyaline, glassy, ovate, with a sharply defined inverted Y-shaped red or fuscous mark . . . . . Hyaliodes

2. Calli distinctly impressed at basal margin, and thus the pronotal disk rather distinctly transversely sulcate . . . . . Dicyphus

Calli not or scarcely impressed at basal margin, pronotal disk not transversely sulcate; head elongated behind eyes for a space equal to at least one-half the lateral width of an eye . . . . . Macrolophus

Genus Dicyphus Fieber, 1858.

Slender, elongate species having pronotal disk distinctly transversely sulcate at base of calli; front of head subvertical, tylus prominent, strongly convex, narrowed behind eyes, forming a short but distinct neck; hemelytra long, narrow, translucent, sides subparallel.

Dicyphus minimus Uhler.

Ent. News, x, 59, 1899.

Length 3.0 mm., width .75 mm.; pale fuscous to black; head black, shining, large, pale spot each side of vertex, almost uniting on middle line and extending to dorsal margin of eyes; antennae fuscous to black, bases of segments I and II more or less broadly pale; pronotum pale to fuscous, scutellum fuscous to black with lateral margins pale on basal half; hemelytra pale translucent to fuscous with

large fuscous to black spot on apical fourth of corium, apex of cuneus, membrane and veins dusky; legs uniformly pale.

Breeds on wild species of Solanum and often a pest on tomatoes and tobacco.

Lucedale, April 24, 1931; Meadville, Aug. 1, 1929, (H. G. Johnston).

Genus Macrolophus Fieber, 1858.

Elongate, slender species having costal margins of hemelytra subparallel; head elongate, front strongly declivent, eyes small, post-ocular space equal to at least half the lateral width of eye; pronotum strongly narrowed toward front, calli prominent, disk with a narrow, median, longitudinal sulcus extending between calli; pseudarolia prominent, attached to claws only at base.

Key to Species.

Length of antennal segment I not equal to width of head across eyes . . . . . separatus

Length of antennal segment I equal to or greater than width of head across eyes . . . . . longicornis

Macrolophus separatus (Uhler).

Proc. Zool. Soc. London, 1894, 194.

Length 3.8 mm., width 1.05 mm.; yellowish to fuscous, apex of scutellum, spot on outer apical fourth of corium, apex of cuneus, and first antennal segment, dark brown to fuscous; hemelytra with fuscous spot at base of each hair except on narrow costal margin; post-ocular space short, equal to little more than half the dorsal width of an eye, without a fuscous stripe behind the dorsal margin of eyes; antennal segment II equal to or scarcely greater than width of pronotum at base. Sexes similar in form and coloration.

Breeds on sage (Salvia urticifolia).

Corinth, May 25, 1931, (H. G. Johnston).

Macrolophus longicornis Knight.

Ent. News, xxxvii, 314, 1926.

Length 4.0 mm., width 1.02 mm.; greenish yellow to fuscous; markings similar to separatus except the fuscous spot at base of hairs on corium much less distinct and confined to inner half; length of antennal segment I equal to or greater than width of head across eyes, II, much greater than width of eye, a fuscous stripe extending from dorsal half of eyes onto pronotal collar. Sexes similar in size and coloration.

Taken with separatus on Salvia urticifolia. Not recorded south of Connecticut.

As stated by Dr. Knight (Bul. Brook. Ent. Soc., xxiv, 147, 1929), this species is probably the same as M. tenui-

cornis Blatchley and if true Blatchley's name has priority.

Corinth, May 25, 1931, (H. G. Johnston).

Genus Hyaliodes Reuter, 1876.

Elongate-oval species having head short, subglobose, vertical in front and strongly constricted behind the eyes to form a short, distinct neck; pronotum campanulate, calli prominent; hemelytra hyaline, with costal margins strongly expanded near base, membrane with but one cell.

Hyaliodes vitripennis (Say).

Complete Writings, i, 345, 1859.

Length 4.6 mm., width 1.6 mm.; yellowish to brown, marked with red and fuscous; pronotum yellowish, usually with collar and calli brownish to fuscous; scutellum usually more or less brown at base; hemelytra hyaline, glassy, more or less brown or red on inner margins of clavus and corium, and across the apex of corium to lateral margin, veins and tips of cuneus, reddish to brown. The coloration is quite variable, some specimens being almost without markings. Sexes similar in size and coloration.

Found on many plants, frequent on oaks and grape; predaceous, especially on plant lice.

Carthage, June 8, Crawford, June 15, Catchings, June 29, Rolling Fork, July 23, Louisville, June 13, 1929,

(H. G. Johnston).

Hyaliodes vitripennis discoidalis Reuter.

Acta Soc. Sci. Fenn., xxxvi, No. 2, 61, 1909.

Differs from vitripennis only in that the base of head, collar, calli, wide band on median line of pronotum, and the scutellum is dark brown to black.

Habitat same as vitripennis (Say).

Carthage, June 3-12, Rolling Fork, July 23, Yazoo City, July 27, Vicksburg, July 27, Natchez, July 31, Brookhaven, Aug. 3, 1929, (H. G. Johnston).

Subfamily Bryocorinae.

Key to Genera.

1. Pronotum without a distinct collar 2
   Pronotum with a distinct collar . . . . . Monalocoris
2. Pronotum posteriorly, gibbous, often strongly so, coarsely punctured; scutellum small, almost concealed 3
   Pronotum not gibbous posteriorly; scutellum large, not at all concealed, with a triangular discal impression . . . . . Halticotoma
3. Pronotum posteriorly strongly gibbous, a longitudinal impression at least in the middle; embolium broadly expanded and flat, not thickened . . . . . Pycnoderes

Pronotum posteriorly moderately gibbous, without longitudinal impressions; embolium narrow, thickened . . . . . Sixeonotus

Genus Monalocoris Dahlbom, 1850.

Short broadly-oval species with head broader than long; eyes small, vertex broad; pronotum with collar and calli distinct, disk strongly convex, finely and sparsely punctate. One widely distributed species is known.

Monalocoris filicis (Linn.).

Systema Naturae, Edition 10, i, 443, 1758.

Length 2.5 mm., width 1.4 mm.; yellowish brown to dark brown, shining, pronotum finely punctate; clothed with fine yellowish hairs; antennae and legs yellowish, antennae slender, segment II distinctly enlarged on apical fourth. Female more robust than male.

Breeds on fern (Aspidium thelypteris).

Natchez, July 31, Meadville, Aug. 1, 1929, (H. G. Johnston).

Genus Pycnoderes Guerin, 1857.

Small, oblong-oval species with eyes small, vertex broad; head, pronotum, and scutellum, deeply, coarsely punctate; pronotum posteriorly, gibbous, with a distinct

median longitudinal impression and usually with shorter lateral impressions; posterior margin of pronotum covering bases of wings and scutellum; hemelytra flat, opaque, impunctate, costal margin visibly curved, embolium broadly expanded, flat, not thickened, cuneus almost horizontal, its fracture shallow.

Key to Species.

Embolium narrow, width distinctly less than twice the thickness of posterior tibiae, moderately curved . . medius

Embolium broad, width at widest point distinctly greater than twice the thickness of posterior tibiae, strongly curved, distinctly reflexed . . . . . drakei

Pycnoderes drakei Knight.

Bul. Brook. Ent. Soc., xxi, 106, 1926.

Female. Length 3.0 mm., width 1.4 mm.; black, shining; antennae and legs pale, apical half of posterior femora fuscous to black on dorsal surface; hemelytra fuscous to black, clavus black, opaque, embolium with large pale spot on basal half, cuneus pale, translucent; pronotum with calli black, smooth, shining; posterior portion strongly gibbous, deeply bilobed, two short lateral impressions each side. Only the female is known. Recorded only from Mississippi.

Carthage, May 2, 1931, (10 specimens, all females),

(H. G. Johnston); Aberdeen, June 26, 1921, (C. J. Drake).

Pycnoderes medius Knight.

Bul. Brook. Ent. Soc., xxi, 105, 1926.

Length 2.9 mm., width 1.3 mm.; black, shining; antennae and legs pale, front coxae and apical half of posterior femora fuscous to black; related to drakei but pronotum not as strongly gibbous and embolium much narrower as in key; pale spot on basal half of embolium small, usually with small pale spot at apex of embolium; membrane and veins distinctly fuscous, darker at base and on veins. Sexes similar.

Known from Missouri, Tennessee, and Mississippi.

Leland, September 15, 1921, (C. J. Drake).

Genus Sixeonotus Reuter, 1876.

Short, oblong-oval species with head broad and with a shallow, longitudinal, median impression on vertex; pronotum with calli small, disk posteriorly moderately gibbous, without median, longitudinal impression, coarsely, closely punctate, finely pilose; hemelytra oval, embolium narrow, thickened, somewhat rod-shaped.

Key to Species.

1. Antennal segments I and II and legs uniformly pale yellowish white . . . . . insignis

Antennal segment I black, II sometimes yellowish . . 2

2. Membrane and veins uniformly black; legs except trochanters and tarsi black . . . . . unicolor

Membrane more or less pale on apical half, sometimes dusky but never black as the veins 3

3. Antennal segment II pale, yellowish to yellowish brown, length distinctly less than width of vertex . . . . . basicornis

Antennae black, segment II equal to or greater than width of vertex 4

4. Membrane abbreviated, extending beyond cuneus for distance equal to its length; legs uniformly pale yellowish . . . . . brevis

Membrane not abbreviated, extending beyond cuneus for a distance greater than its length; legs pale and darkened with fuscous . . . . . areolatus

Sixeonotus insignis Reuter.

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 78, 1876.

Length 3.0 mm., width 1.7 mm.; black, legs and antennae pale yellowish white; head, pronotum and scutellum shining; hemelytra dull, opaque, membrane pale on apical half, veins and cells fuscous to black. Female slightly larger than male.

Breeds on wild and cultivated peas and beans. Some-

times becomes a pest on peas and beans. S. albicornis Blatchley (Ent. News, 37, 168-169, 1926) is a synonym.

Crowder, Aug. 27, 1925, (H. M. Harris); Carthage, Aug. 25, Port Gibson, July 29, Brookhaven, Aug. 3, Tylertown, Aug. 5, 1929; Wiggins, May 5, Tchula, May 18, Holly Springs, May 23, Tupelo, May 25, A. and M. College, May 29, 1931 (Light trap), (H. G. Johnston).

Sixeonotus brevis Knight.

Bul. Brook. Ent. Soc., xxi, 107, 1926.

Female. Length 2.3 mm., width 1.3 mm.; black; antennae black, pale pubescent; legs pale yellowish; pronotal disk distinctly flattened on anterior half, lateral margins distinctly sulcate although broadly rounded on basal angles, basal margin sulcate on median line, and scarcely covering base of scutellum; membrane short as in key, uniformly fuscous, veins black; clothed with prominent, erect, pale yellowish pubescence.

Known from a single female specimen.

Hattiesburg, Aug. 10, 1921, (C. J. Drake).

Sixeonotus areolatus Knight.

Bul. Brook. Ent. Soc., xxiii, 243, 1928.

Length 3.0 mm., width 1.5 mm.; black, shining, hemelytra somewhat less shining than pronotum, brownish on apical half of corium; pronotum and scutellum coarsely, closely punctate;

legs pale darkened with fuscous, apical half of hind femora and basal half of tibiae darker; membrane pale to fuscous, veins black, areoles pale, often somewhat fuscous; clothed with prominent, erect, whitish pubescence, somewhat less prominent on apical half of hemelytra. Female slightly smaller than male.

Breeds on bitterweed (Helenium tenuifolium). Known only from Mississippi, Arkansas, and Texas.

Summit, Sept. 4, 1926, (H. M. Harris); Scott, August 2, 1926, Carthage, August 25, 1928, Valley, July 26, 1929, Wiggins, April 25, 1931, (H. G. Johnston).

Sixeonotus unicolor Knight.

Bul. Brook. Ent. Soc., xxiii, 247, 1928.

Length 3.2 mm., width 1.5 mm.; uniformly black, the trochanters and bases of tarsi only pale; head and pronotum shining; hemelytra dull black, scarcely shining, membrane dark fuscous to black, veins black; clothed with prominent, erect, stiff, white pubescence. Female slightly smaller than male.

Known only from Mississippi.

Belmont, July 5, 1921, (C. J. Drake); Wiggins, May 5, 1931, (H. G. Johnston).

Sixeonotus basicornis Knight.

Bul. Brook. Ent. Soc., xxiii, 248, 1928.

Male. Length 2.8 mm., width 1.47 mm. Head: width

.71 mm., vertex .46 mm. Rostrum: length .54 mm., reaching to middle of sternum. Antennae: segment I, length .22 mm., black, pale at apex; II, .42 mm. yellowish to fuscous, darker on basal third; III, .37 mm., yellowish to fuscous; IV, .55 mm., fuscous. Pronotum: length .86 mm., width at base 1.3 mm.; moderately convex, coarsely, closely punctate; calli distinct, shining; hind margin sinuate on middle, covering base of scutellum. Clothed with prominent, pale pubescence, shorter and distinctly yellowish on hemelytra; chiefly black, legs and ostiole yellowish white; vertex bordering eyes, lora and margins of juga, yellowish brown. Membrane somewhat abbreviated, pale on apical half, veins and areoles fuscous.

Female slightly smaller but similar in color and pubescence.

Collected on a marsh grass near the beach. The male is here described for the first time. The species was originally described from a single female from Black Mountains, North Carolina, and is known only from there.

Long Beach, April 18, 1931, (H. G. Johnston).

Genus Halticotoma Reuter, 1913.

Short, broadly oval species having head very broad, eyes strongly exserted, vertex broad; pronotum short, more

than twice as wide at base as long at middle, basal margin broadly sinuate; scutellum large with a triangular depression on disk. Hemelytra entire. Three species are known, one from Mississippi.

Halticotoma valida Reuter.

Ann. Soc. Ent. Belgique, lvii, 279, 1913.

Length 3.0 mm., width 1.5 mm.; red to reddish brown, hemelytra, apex and lateral margins of scutellum, and antennae fuscous to black, often tinged with reddish; pronotal disk with a deep triangular depression between and in front of calli, an elongate depression on lateral margin extending on propleura to anterior coxal cleft, two smaller depressions near lateral margin behind calli, a large, oval depression on propleura just behind coxal cleft; clothed with prominent, erect, pale yellowish hairs; genital segment of male, on left side, produced into a large, blunt, shining, backward projecting tubercle. Sexes similar.

Breeds on Yucca filamentosa.

Vicksburg, (T. H. Allein); Tupelo, July 1, 1921, (C. J. Drake); West Point, July 16, 1924, (M. R. Smith); Starkville, June 13, 1929, Carthage, May 2, 1931, (H. G. Johnston).

Subfamily Cylapinae.

Genus Peritropis Uhler, 1891.

Elongate oval species having head elongate, porrect, conical in front of eyes; eyes large, coarsely faceted; rostrum reaching or surpassing fourth ventral; pronotum more than twice as wide at base as long, calli prominent, placed near center of disk, lateral margins expanded and reflexed; scutellum large, equilateral; hemelytra thickened, opaque, embolar margin flat, more or less reflexed; legs short, femora stout, tarsi abnormal, only two-jointed.

Peritropis hussevi Knight.

Ent. News, xxxiv, 50, 1923.

Length 3.0 mm., width 1.4 mm.; brownish black, dorsum rather closely covered with small pale spots, most conspicuous on hemelytra; head distinctly cone-shaped before eyes; rostrum reaching upon genital segment; lateral margins of pronotum practically straight, distinctly reflexed, basal margin broadly sinuate, devoid of marginal tubercles; mesoscutum and scutellum dark brown, scarcely spotted with pale, apex of scutellum pale; embolium flat, margin distinctly reflexed; membrane uniformly pale fuscous, veins scarcely darker; sparsely clothed with very fine, short, pale pu-

bescence. Female slightly larger than male, otherwise very similar.

Occurs under bark of dead trees and taken at lights.

This species has not been taken within the state but is recorded from Tuskegee, Alabama, and the writer has taken it at lights at College Station, Texas, so no doubt it occurs in Mississippi. Recorded also from Michigan and Indiana.

Subfamily Clivineminae.

Genus Bothynotus Fieber, 1864.

Oblong-oval species having the head short, subvertical, constricted behind eyes to form a short neck; eyes exserted, vertex broad, slightly convex; antennae densely pubescent, segments I and II stout, III and IV slender; pronotum short, broad, twice as broad at base as long, calli confluent at middle, forming a smooth shining arc; mesoscutum concealed; scutellum deeply impressed at base, a median carina on apical half; hemelytra sometimes dimorphic, membrane present, surpassing abdomen in male, membrane absent, reaching only to fourth dorsal in female; claws toothed at base, without arolia.

Bothynotus johnstoni Knight.

Ent. News, xliv, 135, 1933.

Male. Length 2.7 mm., width 1.17 mm.; general coloration uniformly brownish black, shining, hemelytra semi-translucent; head red, two spots on vertex and a mark each side of front, fuscous; pronotum with disk moderately convex, finely punctate; hemelytra with embolar margins nearly straight, curved in at base; embolium with outer margin sharp, narrowly reflexed; cuneus with outer margin reflexed to form a right angle with disk; legs pale brownish, femora becoming reddish on apical half; dorsum clothed with prominent, erect, pale yellowish to dusky pubescence. Female unknown.

Carthage, June 3, 1926, (H. G. Johnston); the type locality and known only from there.

Subfamily Deraeocorinae.

Key to Genera (Knight 1923).

1. Antennae linear, very long and of nearly equal thickness throughout; vertex transversely striate and longitudinally sulcate; segment II of hind tarsi much shorter than I or III; usually large elongate species . . . . . Eustictus

Antennae not so long or linear, segment II slender at base and slightly enlarged toward apex; vertex

usually polished; segment II of hind tarsi equally long as I or III or nearly so 2

2. Head strongly produced and nearly horizontal, facial angle acute, tylus projecting beyond apex of first antennal segment; dorsum thickly covered with stiff erect pubescence; embolar margin thin and broadly expanded, sides nearly parallel . . . . . Eurychilopterella

Head less produced, scarcely surpassing middle of first antennal segment, facial angle either a right angle or only slightly less; dorsum either pubescent or practically glabrous; embolium not as above . . . . . Deraeocoris

Genus Eustictus Reuter, 1909.

Elongate, subglabrous, shining species with front subvertical, transversely striate and longitudinally sulcate; antennae linear, segment II subcylindrical; pronotum convex, shallowly and sparsely punctate, hind margin broadly rounded; hemelytra entire, sparsely punctate, cuneus slightly deflexed.

Eustictus salicicola Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 482, 1923.

Length 7.0 mm., width 2.5 mm.; pale yellowish to yellow-

ish brown marked with fuscous; head yellowish, front with transverse striae brownish; antennae pale, segment I marked with irregular black spots, II yellowish to brown, in male densely covered with short, fine yellow hairs and a few longer hairs which scarcely exceed thickness of segment, in female a few short, fine yellow hairs and many long hairs which exceed twice the length of segment; III and IV brown covered with short hairs; pronotum with median portion of disk dark brown to black; scutellum brown to black, basal angles paler; hemelytra pale yellowish, translucent, marked with fuscous, clavus along commissure, inner apical angle of corium, and punctures, brown to black, cuneus yellowish translucent, inner apical margin blackish, membrane dusky, veins darker; legs, pale, femora marked on apical half with fuscous spots, tibiae with three broad fuscous bands; venter pale, spotted with red, a dark impressed spot near dorsal margin of each segment.

Found on bark of willow (Salix) where both nymphs and adults are probably predaceous.

A. and M. College, April 21, 1915, (H. F. Wallace).

Genus Eurychilopterella Reuter, 1909.

Oblong-oval species having the head elongate, porrect, front feebly declivent; first antennal segment scarcely

reaching apex of tylus; pronotum densely, coarsely punctate, calli prominent; hemelytra with embolar margins flat, greatly expanded. Three species are known.

Eurychilopterella luridula Reuter.

Acta Soc. Sci. Fenn., xxxvi, No. 2, 60, 1909.

Length 4.5 mm., width 1.8 mm.; dorsum fuscous to black marked with pale; head with two broad pale bands extending from vertex along dorsal margins of eyes to bases of antennae; pronotum closely, coarsely punctate, collar, median line and broad band behind calli pale; scutellum black, median line pale; hemelytra with basal third of clavus, basal half of corium and embolium, largely pale, cuneus with large pale spot on inner basal angle, membrane dusky, veins darker; legs and antennae chiefly pale; densely covered with stiff, erect, pubescent hairs.

Collected on pine. Apparently predaceous. Recorded only from Chicago, New York, Maryland and District of Columbia.

West Point, June 19, 1929, (H. G. Johnston).

Genus Deraeocoris Kirschbaum, 1855.

Oval or elongate-oval, shining species with head only slightly declivent, usually broader than long, impunctate,

basal carina usually distinct; rostrum reaching upon or slightly surpassing middle coxae, rarely (grandis) reaching second abdominal segment; pronotum trapezoidal, collar narrow, disk convex, rather coarsely punctate; hemelytra entire, surpassing abdomen, cuneus rather strongly deflexed, fracture deep; legs moderately long, tibiae with prominent hairs.

Key to Species.

1. Scutellum distinctly punctate; pronotum distinctly margined 2

   Scutellum impunctate 3

2. Cuneus red; membrane infuscated at apex . . . poecilus

   Cuneus fuscous to black on apical half; membrane nearly clear but with a small fuscous spot on each side of apical half . . . . . nebulosus

3. Dorsum practically glabrous, at most only finely and sparsely pubescent (not rubbed specimens), rarely a few hairs at anterior angles of pronotum; hind tibiae with a row of spines or heavily chitinized hairs on anterior face 5

   Dorsum densely pubescent; hind tibiae without distinct spines on anterior face, usually rather densely clothed with long, prominent hairs . . . 4

4. Lateral margins of pronotum black or only narrowly pale at anterior angles . . . . . (Typical) savi

Lateral margins of pronotum broadly pale or reddish . . . . . savi var. marginatus

5. Tibiae banded with fuscous or pale . . . . aphidiphagus

Tibiae uniformly pale or yellowish 6

6. Hind femora with two brown or fuscous bands near apices; apical half of membrane with a distinctly rounded fuscous spot, usually connected at base by a fuscous streak which extends between the large areoles; calli yellowish . . . fasciolus var. castus

Hind femora with but one fuscous band; apical half of membrane pale or clouded with fuscous but not forming a rounded spot on apical half 7

7. Dorsum pale to yellowish, frequently becoming fuscous to blackish but always with some pale, usually a pale median line extending over pronotum and scutellum; calli entirely black . . . . . quercicola

Dorsum uniformly brownish black . . . . . davisi

Deraeocoris nebulosus Uhler.

U. S. Geol. Survey Terr., Montana, p. 417, 1872.

Length 3.7 mm., width 1.8 mm.; ovate glabrous, shining; yellowish brown, tinged with olive green, darkened with fuscous and black; calli, two large spots on disk of pronotum,

disk of scutellum, and apical half of hemelytra fuscous to black, basal angle and apex of scutellum, outer basal angle and a small spot on inner margin of cuneus, ivory white; membrane clear, two fuscous spots on apical half, one each side of middle, veins fuscous; legs reddish brown to fuscous, apex of femora, tibiae and tarsi yellowish, tibiae with two broad reddish brown bands; pronotum, scutellum and hemelytra coarsely punctate. Female slightly more robust than male.

Predaceous; found on many plants.

Meridian, April 28, Carthage, May 2, Rolling Fork, July 23, 1931; Scott, Aug. 1, 1926; Laurel, Aug. 14, 1929, (H. G. Johnston).

Deraeocoris poecilus McAtee.

Ent. News, xxx, 246, 1919.

Length 4.5 mm., width 2.2 mm.; reddish brown darkened with fuscous; pronotum yellowish to fuscous, calli and punctures black; lateral margins and apex of scutellum, ivory white; outer apical angle of corium, and spot on middle, fuscous; cuneus red, margins of apical half fuscous, basal angles yellow; membrane clear, a rather distinct, oval, fuscous spot on apical half; legs reddish brown, apex of coxae, trochanters, apex of femora, tibiae and tarsi, yellowish, middle and hind tibiae with three broad, reddish brown bands; dorsum glabrous, shining, coarsely, closely punctate. Female more robust than male.

Predaceous; found on birch (Betula nigra) infested with aphids.

Not recorded south of South Carolina.

Columbia, May 12, Laurel, Aug. 14, 1929, (H. G. Johnston).

Deraeocoris fasciolus castus Knight.

Eithteenth Rept. State Ent. Minn., 125, 1921.

Length 6.5 mm., width 3.0 mm.; nearly a uniform pale yellowish brown; calli usually lined with black but often entirely brownish; a faint brownish ray behind each callus; scutellum usually uniformly dull yellow, sometimes with two darker rays on disk; hemelytra brownish, embolium pale, translucent; membrane with a distinct rounded fuscous spot on apical half, usually connected at base with a fuscous streak extending from between the areoles; legs usually wholly yellow, apex of hind femora sometimes fuscous.

Predaceous; found on grape (Vitis) infested with aphids. Not recorded south of Maryland.

Grenada, May 20, A. and M. College, May 29, 1931, (H. G. Johnston).

Deraeocoris aphidiphagus Knight.

Eighteenth Rept. State Ent. Minn., 134, 1921.

Length 6.0 mm., width 2.9 mm.; grayish brown to fuscous; calli shining black, space in front of and extending between calli, light yellow; scutellum brown with lateral margins and median line pale; corium with large spot on middle and

a second at apex fuscous, sometimes combined to make apical half fuscous; embolium pale translucent, fuscous on apical fourth; cuneus pale, hyaline, apex black; membrane pale with irregular fuscous spot on apical half, veins brownish; legs pale yellow, apex of hind femora with two broad brown bands, hind tibiae with three bands; dorsum glabrous, shining, closely and coarsely punctate, scutellum impunctate.

Taken at light trap. Not recorded south of Virginia. A. and M. College, May 29, 1931, (H. G. Johnston).

Deraeocoris quercicola Knight.

Eighteenth Rept. State Ent. Minn., 138, 1921.

Length 5.6 mm., width 2.5 mm.; rather uniformly fuscous to blackish, pronotum paler; calli black, disk of pronotum brown, usually with lateral margins and median line pale; scutellum brown, basal angles, apex and often the median line, yellow; hemelytra dark brownish to black, darkest at middle and on outer apical half of corium, embolium, except apically, and clavus, pale brownish translucent, cuneus pale translucent, apex broadly black; membrane pale to fuscous, veins brown to fuscous; legs pale, hind femora with two fuscous marks on dorsal surface near apices.

Found on Quercus alba. This species has not been taken within the state but has been recorded from Georgia, New Mexico, and Colorado and no doubt is to be found on white oak in Mississippi.

Deraeocoris davisi Knight.

Eighteenth Rept. State Ent. Minn., 140, 1921.

Length 5.3 mm., width 2.5 mm.; uniformly brownish to black, antennae and legs chiefly pale; pronotal disk brownish to black, darker on anterior third, more coarsely punctate behind calli, lateral margins carinate, nearly straight; scutellum brownish, small spot on basal angles and often apex yellowish brown; hemelytra brownish to black, embolar margin more or less pale, cuneus pale translucent on the middle, membrane clear or practically so, apical half often stained with brownish, veins and apex of areoles fuscous; legs pale yellowish, apices of hind femora with fuscous usually forming an incomplete band but sometimes forming two complete bands.

Nymphs and adults found on post oak (Quercus stellata), where they are probably predaceous. Recorded only from Indiana, New York, and Alabama.

Holly Springs, May 23, Corinth, May 25, Tupelo, May 26, 1931, (H. G. Johnston); Wiggins, May 29, 1931, (J. P. Kislanko).

Deraeocoris sayi (Reuter).

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 76, 1876.

Length 7.5 mm., width 3.5 mm.; brownish to black, head,

collar, and prosternum yellow, scutellum red; legs brownish to black, apex of coxae, trochanters, two broad bands on tibiae, and two basal segments of tarsi yellowish; densely covered with long, erect, yellowish pubescence.

Breeds on oak (Quercus spp.).

A. & M. College, May 29, 1931, (light trap), (H. G. Johnston).

At College Station, Texas, this species breeds abundantly on post oak (Quercus stellata), and is apparently not predaceous.

Deraeocoris sayi marginatus Knight.

Eighteenth Rept. State Ent. Minn., 176, 1921.

Differs from typical sayi only in being more broadly pale or yellowish; lateral margins of pronotal disk broadly yellow and extending upon propleura.

Breeds on post oak (Quercus stellata).

Carthage, May 2, 1931, (H. G. Johnston).

Subfamily Orthotylinae.

Key to Tribes.

(Adapted from Knight, 1923).

1. Pronotum with pleural area separated from dorsum by a distinct suture; pronotal disk raised posteriorly and projecting above the scutellum . . . Semiini

Pronotum not separated by a distinct lateral suture; base of pronotal disk not projecting above scutellum 2

2. Body robust, short oval or ovate, femora saltatorial; head strongly vertical, width of vertex greater than length of head when seen from above .. Halticini

Body usually elongate; length of head usually greater than width of vertex; if not then the head not sharply vertical, or the thorax sulcate-sinuate at the sides 3

3. Antennal segment 3 equally thick as segment 2, or nearly so 4

Antennal segment 3 distinctly more slender than segment 2 5

4. Thorax campanulate, apex of pronotum scarcely greater than width of vertex; slender species, hemelytra medially coarctate, abdomen slender at base; females usually brachypterous, abdomen very broad but narrowed at base . . . . . Systellonotini

Thorax not distinctly campanulate, apex of pronotum wider than vertex; sometimes slender but in such case the hemelytra not medially coarctate, the abdomen broad at base; females frequently brachypterous but abdomen not at all narrowed at base . . . . . Ceratocapsini

5. Slender ant-like species, especially in the shape of the head; sides of pronotum more or less sulcate-sinuate, or greatly narrowed on the apical half; usually with silvery markings composed of deciduous scale-like hairs . . . . . Pilophorini

Form not ant-like; sides of pronotum not sulcate-sinuate; devoid of silvery markings like the above 6

6. Head strongly produced vertically; genae high, usually as great as the height of an eye, but if not then the front above the tylus is prominent when seen from above, the outline of front describing a sinuate arc between the eyes, the width of vertex being greater than length of head . . . . . Lopidini

Head not so strongly produced vertically; genae medium or low, not equal to height of an eye; head usually as long or longer than width of vertex . . . . . Orthotylini

Tribe Semiini.

Genus Semium Reuter, 1876.

Small oblong, opaque species having head short, broad, the front subvertical; pronotum with pleural area separated

from disk by a distinct suture, disk with a broad and a narrow transverse impression on anterior half, posterior half convex and projecting above base of scutellum; disk of scutellum with a large triangular impression; hemelytra entire. Two species are known, one from Mississippi.

Semium hirtum Reuter.

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 80, 1876.

Length 2.8 mm., width 1.0 mm.; general color velvety brown; legs and antennae dark red, head, depressions on anterior half of pronotum, pleura, scutellum and sides of venter, rosy red, corium except apex and area on inner margin, base of clavus, and cuneus except apex, yellowish white, membrane uniformly fuscous, a pale spot at apex of cuneus; densely covered with erect bristly pubescence.

Breeds on Euphorbia sp., living on the red lower surface of the leaves. The plant is decidedly prostrate in form with the lower surface of the leaves practically in contact with the soil. In Texas, nymphs in all stages of development, and adults have been observed on plants where the surface soil temperature was about 140° F. for a considerable portion of the day.

Charleston, September 10, 1925, (H. M. Harris).

Tribe Halticini.

Key to Genera.

1. Head with well defined sharp basal margin; black forms 2

   Head without well defined sharp basal margin; head and dorsum thickly clothed with closely appressed scale-like hairs and intermixed with more erect long pubescent hairs; color variable but never black . . . . . Parthenicus

2. Antennae very long and slender; segment II four or more times longer than segment I; short, oval, strongly convex; brachypterous forms common . . . . . Halticus

   Antennae shorter, segment II little more than three times longer than segment I; larger oblong forms; dorsum nearly glabrous, shining black; hemelytra entire . . . . . Strongylocoris

Genus Parthenicus Reuter, 1876.

Elongate, subparallel, opaque, pubescent species with head broad, front subvertical, vertex ecarinate at base; rostrum reaching or surpassing apex of hind coxae; pronotum twice as wide at base as long, apex about two-thirds the

width of base, calli scarcely evident; hemelytra usually entire with embolar margins subparallel; female sometimes brachypterous; hind femora thickened, saltatorial. One species is known from Mississippi.

Parthenicus juniperi (Heidemann).

Jour. N. Y. Ent. Soc., xiii, 49, 1905.

Length 3.0 mm., width 1.0 mm.; pale yellowish, cuneus reddish, apical third of corium, and base of head tinged with reddish, often becoming fuscous; scutellum and base of clavus fuscous; legs pale, femora tinged with reddish or perhaps more often with fuscous; dorsum clothed with fine erect, golden pubescence, intermixed with closely appressed scale-like hairs that are silvery on scutellum and a transverse band across corium at apex of clavus, black across apex of corium and forming two spots on inner margin of cuneus at middle and base; membrane uniformly fuscous and irridescent. Sexes similar in form and color.

Breeds on red cedar (Juniperus virginiana).

Crawford, June 15, Vicksburg, July 27, Ackerman, Aug. 19, Starkville, Aug. 20, 1931, (H. G. Johnston).

Genus Halticus Hahn, 1831.

Short, oval, or elongate species having the head long, pointed, vertical; antennae usually longer than the body,

segment II four or more times longer than segment I; brachypterous forms common, the membrane absent; hind femora saltatorial, long, stout, somewhat curved and flattened on the inner side.

Key to Species.

Antennal segment II fuscous, at least at base and apex; smaller species, not more than 2 mm. in length . . . citri

Antennal segment II pale, fuscous only at apex; larger species 3 mm. or more in length . . . . . intermedius

Halticus citri Ashmead.

Ent. Amer., iii, 155, 1887.

Male. Length 2.0 mm., width 0.7 mm.; black, scarcely shining; antennae fuscous, middle of segment II and base of III pale, segment I sometimes pale in male; legs black, apex of femora, tibiae and tarsi pale; clothed with very fine, pale pubescence and intermixed with patches of silvery to greenish, deciduous, tomentose pubescence.

Female. Length (brachypterous) 1.5 mm., width 1.0 mm.; this form is much broader and more strongly convex, the hemelytra reach to about middle of abdomen, cuneus and membrane absent; pronotum shorter, subquadrate, less declivent; color and pubescence similar to male. Length (macropterous) 1.9 mm., width .96 mm.; decidedly broader and more oval than

male, embolar margins broadly curved on apical half; otherwise similar to the male.

Breeds on a wide variety of plants and is often a serious pest on cultivated crops, especially legumes and garden crops.

Holly Springs, May 23, Vicksburg, July 27, Meadville, Aug. 1, Brookhaven, Aug. 3, Newton, Aug. 15, Carthage, Aug. 25, 1929, (H. G. Johnston).

Halticus intermedius Uhler.

Proc. U. S. Natl. Mus., xxvii, 360, 1904.

Length 3.5 mm., width 2.0 mm.; black, shining; antennae pale, narrow apex of segment II and most of III and IV fuscous; legs reddish brown, apex of femora, tibiae and tarsi, pale; hemelytra uniformly black, membrane dusky, embolar margin strongly arcuate, cuneal fracture forming a deep notch, a smaller notch formed between apex of cuneus and membrane; clothed with fine, pale pubescence, and the dorsum with patches of silvery or greenish, deciduous, tomentose pubescence.

Breeds on Clematis virginiana, where it is often a pest.

Starkville, July 7, 1924, (M. R. Smith).

Genus Strongylocoris Blanchard, 1840.

Elongate-oval, shining species having the head short, broad, subvertical, vertex distinctly carinate; pronotum broad, more or less flattened on anterior half, posterior

margin broadly rounded; scutellum flat, finely, transversely, striate; dorsum finely, evenly punctate; hemelytra entire. Strongylocoris atratus (Uhler).

Proc. Cal. Acad. Sci., ser. 2, iv, 268, 1894.

Length 4.5 mm., width 2.0 mm.; black, strongly shining, nearly glabrous; finely, densely, rugose-punctate; antennae black in male, more or less pale in female, segment II in female but little if any longer than width of head across eyes; right male clasper with median tooth short, obtuse, forming an arc shorter than a semicircle with the quadrifid apex, the latter usually forming four acute teeth, the dorsal one much the longer; membrane dark brown to fuscous.

Breeds on goldenrod (Solidago spp.), and probably other Compositae.

Carthage, May 2, Natchez, May 15, Water Valley, May 12, Winona, May 21, Holly Springs, May 23, Tupelo, May 26, 1931, (H. G. Johnston).

Tribe Lopidini.

Key to Genera.

Base of tylus below a line drawn through lower margins of eyes; without an oblique suture beneath the eye dividing the gena . . . . . Ilnacora

Base of tylus above a line drawn through lower margins of eyes; an oblique suture extending from base of antenna to beneath the eye dividing the gena . . Lopidea

Genus Ilnacora Reuter, 1876.

Slender, elongate, subparallel species having head broad, subvertical, vertex broad, more or less flat, carinate on middle of base, genae very high, height greater than the depth of an eye, strongly convex; pronotum trapezoidal, without a distinct collar, but with a narrow, apical, flattened area resembling a collar, calli prominent; hemelytra entire; dorsum clothed with pale, suberect hairs and patches of black, deciduous, scale-like hairs.

Ilnacora stalii Reuter.

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 86, 1876.

Length 5.5 mm., width 1.8 mm.; pale greenish-white; antennae pale, segment I with a narrow basal band and a broader one near apex fuscous, II, somewhat dusky, darker on base and apex, III and IV, dusky; dorsum with pale, suberect pubescence and patches of black, scale-like hairs forming prominent spots behind each callus, at middle of base of scutellum and at inner basal margin of cuneus, these easily rubbed off and are often absent.

Breeds on giant ragweed (Ambrosia trifida) and cocklebur (Xanthium spp.), and probably other related weeds.

Carthage, June 8, Lamont, July 21, Valley, July 26, Vicksburg, July 27, Natchez, July 31, Brookhaven, Aug. 3, Scott, Aug. 4, 1929, (H. G. Johnston).

Genus Lopidea Uhler, 1872.

Elongate, subparallel, impunctate, almost glabrous species having the head twice as long as broad, vertex flat with rather prominent carina at middle; eyes small, finely faceted; tylus prominent; calli prominent, a distinct V-shaped impression between and in front of calli leaving a distinct transverse ridge on subapical margin of pronotum, posterior half of pronotum convex, basal angles broadly rounded, basal margin subtruncate; hemelytra entire, embolar margins broadly curved.

This genus forms a rather large group of confusing species that may be readily separated on the basis of male genitalia but as yet no suitable characters have been found to separate them in a key.

Lopidea confluens (Say).

Complete Writings, i, 341, 1859.

Male. Length 6.3 mm., width 2.1 mm.; yellowish orange tinged with red and marked with fuscous; scutellum, apical

two-thirds or more of clavus, inner margins of corium, membrane and more or less broadly on pronotum, fuscous; base of head, a stripe each side of front converging on vertex, antennae, tylus and rostrum, black; legs fuscous to black, apex of coxae and trochanters, yellow; dorsum sparsely clothed with short, recumbent hairs, pronotum and scutellum practically glabrous; genital claspers distinctive.

Female. Length 6.5 mm., width 2.5 mm.; larger and more robust than the male but similar in coloration.

According to Knight this species breeds on Polymnia uvedalia and P. canadensis. This species has not been taken in Mississippi but is recorded from Alabama and Missouri and no doubt will be found within the state.

Lopidea davisi Knight.

Ent. News, xxviii, 458, 1917.

Coloration similar to confluens but shorter, more robust, and usually more reddish in color.

Male. Length 5.5 mm., width 2.0 mm.; yellowish orange to rather dark reddish; base of pronotum, often the calli, scutellum, clavus, inner half of corium, and membrane, fuscous; head, antennae, and legs as in confluens; pubescence slightly more dense than in confluens; genital claspers distinctive.

Female. Length 5.7 mm., width 2.2 mm.; slightly more robust than the male but very similar in coloration.

Breeds on several species of wild Phlox and has, in recent years, become a serious pest on cultivated Phlox.

Carthage, June 7, 1930, and June 23, 1929, (H. G. Johnston).

Lopidea minor Knight.

Ent. News, xxix, 213, 1918.

Male. Length 4.5 mm., width 1.6 mm.; reddish orange to orange yellow; disk of pronotum, scutellum, clavus, and inner half or more of corium, fuscous; membrane fuscous tinged with reddish, veins reddish; cuneus not fuscous even on inner margin; antennae, legs, and genital segment, fuscous to black; dorsum rather sparsely clothed with prominent yellowish to brownish pubescence; genital claspers distinctive but showing a close relationship to davisi.

Female. Slightly more robust but very similar to male.

Breeds on Phlox pilosa.

This species was described from Colorado and North Dakota, and has since been recorded from Iowa, New York, Alberta, Canada, and El Paso, Texas.

Corinth, May 25, Booneville, May 26, 1931, (H. G. Johnston).

Lopidea salicis Knight.

Ent. News, xxviii, 457, 1917.

Male. Length 5.7 mm., width 1.94 mm.; largely fuscous

to black; propleura, lateral margins of pronotum, embolium, and cuneus except inner margin, orange yellow; often the pronotum, except calli, basal third of clavus, and lateral half of corium, also orange yellow; a narrow band along front margin of eye, juga, and genae, yellowish white; legs fuscous to black, apices of coxae pale; dorsum sparsely clothed with fine recumbent pubescence; genital claspers distinctive.

Female. Slightly more robust than the male but very similar in coloration.

Breeds on Salix nigra.

One specimen, a teneral female, taken on willow at Holly Springs, May 23, 1931, is evidently this species. The species has been collected on the same host at College Station, Texas. Recorded only from New York and Minnesota.

Lopidea robiniae (Uhler).

Proc. Ent. Soc. Philadelphia, i, 24, 1861.

Male. Length 6.5 mm., width 2.0 mm.; orange yellow marked with fuscous; rather densely clothed with short, stiff, suberect pubescence, more prominent on pronotum and scutellum; coloration very similar to confluens described above but readily separated by differences in pubescence; genital claspers distinctive.

Female. Slightly more robust than male but similar in

coloration and pubescence.

Breeds on black locust (Robinia pseudo-acacia). Not recorded south of North Carolina.

Houston, May 30, 1931, (H. G. Johnston).

Lopidea media (Say).

Heteroptera New Harmony, p. 22, 1832.

Male. Length 5.5 mm., width 1.6 mm.; usually bright red but sometimes orange red; scutellum, clavus, and corium, more or less infuscated but the red always showing through the infuscation; cuneus scarcely infuscated even on inner margin; membrane black tinged with reddish, veins, especially the radius, reddish or yellowish in the pale forms; legs and antennae black, tinged with reddish except in the pale forms; pronotum and scutellum practically glabrous, hemelytra sparsely clothed with very fine, closely appressed pubescence; genital claspers distinctive.

Female. Length 5.6 mm., width 1.7 mm.; coloration usually similar to male but often the embolium and outer margin of cuneus pale yellowish; pubescence much the same as in the male.

Breeds on golden-rod (Solidago sp.) and probably other plants.

A. & M. College, May 22, 1925, and May 29, 1931, (trap light), (H. G. Johnston).

Lopidea reuteri Knight.

Ent. News, xxviii, 459, 1917.

Male. Length 7.1 mm., width 2.5 mm.; deep carmine red; head largely black; pronotum, except lateral margins, scutellum, clavus, and inner half of corium, fuscous; antennae black, segments I and II stout, II thickest before the middle and tapering to much more slender at apex, greatest thickness almost equal to segment I; legs, mesosternum and genital segment fuscous; genital claspers distinctive.

Female. Length 6.9 mm., width 2.5 mm.; structurally and in coloration very similar to male.

Occurs on mixed vegetation in open pine woods. Not recorded south of Virginia and Missouri.

Carthage, June 7, 1930, and June 12, 1926, (H. G. Johnston).

Lopidea hesperia (Kirkaldy).

Trans. Ent. Soc. London, 1902, 252.

Male. Length 7.4 mm., width 2.6 mm.; deep carmine red; calli, scutellum, apical half of clavus, and narrowly on inner apical margin of corium, lightly infuscated but distinctly tinged with reddish; head fuscous; antennal segment I, length .71 mm., thickness .20 mm.; II, length 2.7 mm., greatest thickness .16 mm., reddish brown, densely clothed

with coarse, stiff, black hairs; III and IV slender, black, clothed with fine, pale pubescence; legs fuscous to black; genital claspers distinctive, although showing a close relationship to reuteri.

Female similar to male in structure and color.

This species is about the size of reuteri but is much more broadly red and the infuscated areas distinctly more reddish. Recorded only from "St. Johns Bluff, East Florida", the type locality.

Holly Springs, May 23, 1931, (H. G. Johnston). One male and two females taken while sweeping mixed vegetation among a dense growth of willows.

Lopidea instabilis (Reuter).

Acta Soc. Sci. Fenn., xxxvi, No. 2, 72, 1909.

Male. Length 5.5 mm., width 2.1 mm.; bright red with apical half of clavus and inner half of corium infuscated; membrane fuscous tinged with reddish, veins usually reddish, sometimes black; antennae stout, segment I, length .58 mm., thickness .16 mm.; II, 1.8 mm., greatest thickness .14 mm., tapering to much thinner at apex, reddish brown to fuscous, clothed with prominent, stiff, black hairs; III and IV slender, cylindrical, black; tibiae and tarsi fuscous to black; genital claspers distinctive although variable.

Female. Length 6.0 mm., width 2.5 mm.; similar in structure and coloration to male.

The right genital clasper of this species is quite variable in that the prominent curved horn near middle of ventral surface is often reduced or absent. This led Dr. Knight (Hemiptera of Connecticut, 505, 1923) to consider variety marginalis Reuter a distinct species. Thus his figures 77 (instabilis) and 78 (marginalis) represent the approximate extremes of this variation.

Occurs on cultivated vetch which is probably a host.

Carthage, June 12, 1926, (H. G. Johnston); Wiggins, May 29, 1931, (J. P. Kislanko).

Tribe Orthotylini.

Key to Genera.

1. Pronotal disk immarginate although sometimes forming a rather sharp angle; antennal segment II linear; vertex scarcely margined and never fitting closely against the front margin of pronotum 2

Pronotal disk margined at sides; antennal segment II incrassate, fusiform, segment III thickened but more slender than II; vertex strongly carinate and fitting closely against anterior margin of pronotum; clothed with closely appressed scale-like pubescence, and intermixed with fine, erect hairs . . . . . Heterocordylus

2. Antennal segment I with black line on each side and connected beneath near apex; eyes elongate as seen from above, their inner margins parallel; color white or greenish; clothed with rather long white pubescence . . . . . Reuteria

Antennal segment I never with longitudinal black lines; eyes not so much elongate when seen from above, their inner margins diverging 3

3. Eyes set close to pronotal angles and nearly forming a straight line with base of vertex 4

Eyes rounded behind, thus bringing the center of eyes near middle of head and away from pronotal angles; small, delicate, translucent, pale green species . . . . . Diaphnidia

4. Pubescence composed only of simple, erect hairs; left genital clasper bifurcate near base, thus divided into two prominent arms . . . . Orthotylus

Pubescence composed of two types of hairs, simple erect hairs intermixed with recumbent, scale-like pubescence; left genital clasper represented by a simple curved hook, not bifurcate . . . . . Melanotrichus

Genus Melanotrichus Reuter, 1875.

Elongate-oval species having head rather broad, its

front strongly declivent; vertex rather flat, its base feebly carinate; tylus prominent, the base on or above a line through base of antennae; pronotum short, broad, twice as wide at base as long, disk rather flat, calli prominent; antennae linear, thinly clothed with fine hairs; hemelytra entire; pubescence composed of two types of hairs, recumbent, scale-like hairs intermixed with simple, erect hairs; left clasper represented by a simple curved hook.

Key to Species.

Veins and areoles green; general color green or yellowish green . . . . . flavosparsus

Veins yellowish white, areoles dusky; general color pale yellowish white . . . . . catulus

Melanotrichus catulus (Van D.).

Proc. Cal. Acad. Sci., ser. 4, vi, 106, 1916.

Length 4.2 mm., width 1.6 mm.; nearly uniformly pale yellowish brown, the head, calli and mesoscutum tinged with yellowish and the scutellum and corium slightly infuscated; membrane dusky, veins paler; dorsum clothed with stiff, erect, brown hairs and intermixed with rather inconspicuous, recumbent, yellowish-scale-like hairs; genital claspers distinctive.

Female slightly more robust than the male but similar

in coloration and pubescence.

Breeds on Gnaphalium uliginosum to which it is apparently restricted. Not recorded south of the District of Columbia.

Corinth, May 23, 1931 (H. G. Johnston).

Melanotrichus flavosparsus (Sahlberg).

Acta Soc. Sci. Fenn., i, 411, 1842.

Length 4.2 mm., width 1.4 mm.; elongate-oval, sides nearly parallel; dorsum clear green, tinged with yellowish; head, calli, mesoscutum, antennae, and legs more yellowish than green; membrane dusky, iridescent; veins and areoles green; rather sparsely clothed with coarse, stiff, erect, black hairs with a small, dark green spot at base of each and intermixed with small patches of silvery scale-like pubescence; genital claspers distinctive.

Female slightly more robust but very similar to male.

Breeds on Chenopodium album.

This species has not been recorded from Mississippi but is recorded from Florida and is widely distributed throughout the eastern United States and Texas.

Genus Orthotylus Fieber, 1858.

This genus is very closely related to Melanotrichus and differs principally in the type of pubescence and male

genitalia. Dorsum clothed only with simple, erect pubescent hairs; left genital clasper bifurcate near base, forming two prominent arms; head short, broad, nearly vertical; vertex flat or depressed, feebly but distinctly carinate.

Key to Species.

1. General color green, dark markings if present, not clouding the corium 3

   General color pale yellowish-brown to black, sometimes greenish but then the corium marked with fuscous or black areas 2

2. Hind femora fuscous to black on apical half or more; clavus, apical half of corium, calli, and usually pronotal disk, except median line and lateral margins, fuscous to black . . . . . ornatus

   Hind femora uniformly greenish or yellowish green; dorsum usually largely fuscous to black; embolium, base of corium, cuneus and often apex of scutellum, yellow in male; female more broadly pale . . modestus

3. Dorsum clothed with short, stiff, fuscous hairs . . . . . chlorionis

   Dorsum clothed with pale or yellowish hairs 4

4. Tylus with brown or fuscous spot at base . . . . viridis

   Tylus without brown or fuscous spot at base 5

5. Rostrum short, scarcely surpassing hind margin of mesosternum; length of antennal segment II not equal to width of pronotum at base . . . . . robiniae

Rostrum reaching or surpassing middle of intermediate coxae; length of antennal segment II equal to or greater than width of pronotum at base 6

6. Small, length not greater than 3.3 mm., hemelytra distinctly green; pronotum and scutellum yellowish . . . . . taxodii

Larger, length not less than 3.8 mm., uniformly yellowish to yellowish-green . . . . . ramus

Orthotylus chlorionis (Say).

Heteroptera New Harmony, p. 25, 1832.

Length 3.6 mm., width 1.1 mm.; clear green to yellowish green; head, pronotum, and scutellum yellowish; membrane pale, veins green; head short, broad, subvertical; rostrum short, not or scarcely reaching the posterior margin of mesosternum; dorsum clothed with short, stiff, suberect, fuscous hairs; genital claspers distinctive.

Female similar to male but slightly more robust.

Breeds on honey locust (Gleditsia triacanthos), the only known host. Recorded south of Indiana and Washington, D. C., only from Texas.

Crawford, April 29, Tupelo, May 26, 1931, (H. G. Johnston).

Orthotylus ramus Knight.

Can. Ent., lix, 178, 1927.

Length 3.9 mm., width 1.5 mm.; uniformly pale green or yellowish green; rostrum reaching or surpassing middle of intermediate coxae, yellow, apex fuscous; membrane pale iridescent green, veins pale green; dorsum clothed with prominent, simple, pale yellowish pubescence; genital claspers distinctive, right clasper forked near base, forming two long, inwardly curved, acuminate arms; genital segment with strong chitinous spine projecting posteriorly from dorsal margin.

Female slightly more robust but very similar to male.

Breeds on Carya spp. Found in enormous numbers on pecan where it feeds largely on the developing catkins. Very abundant throughout the state on hickory and pecan trees. Described from Ohio, Michigan, New York, and Iowa, and since recorded only from Texas.

Orthotylus robiniae Johnston.

Bul. Brook. Ent. Soc., xxx, No. 1, 15, 1935.

Length 3.6 mm., width 1.3 mm.; uniformly green or yellowish green; membrane dusky, veins pale green; antennal segment II short, not equal to width of pronotum at base; rostrum short, scarcely surpassing posterior margin of mesosternum; genital claspers distinctive; ventral arm of left

clasper curving inward and upward forming an elongate "S", right clasper forked near apex, forming two short flattened arms with short, blunt teeth on their apices; dorsal margin of genital segment with small, very slender, chitinous spine projecting posteriorly.

Female similar to male in structure and coloration.

Occurs on locust (Robinia pseudo-acacia), which is no doubt the host plant.

Known only from Natchez, the type locality. Collected May 15, 1931, (H. G. Johnston).

Orthotylus ornatus Van Duzee.

Proc. Cal. Acad. Sci., ser. 4, vi, 122, 1916.

Male. Length 5.5 mm., width 1.7 mm.; principally brownish black to black; vertex yellow with two brownish to fuscous spots near margin of eyes; antennae fuscous to black; apex and sometimes broadly on disk of scutellum, basal angles of corium, and basal half or more of cuneus, pale yellowish; often the pronotal disk except calli and a broad ray behind each, and the cuneus, pale yellowish; membrane fuscous, veins pale; legs dusky, hind femora fuscous, at least on apical half; dorsum clothed with fine yellowish pubescence; genital claspers distinctive.

Female. Length 6.0 mm., width 2.05 mm.; principally yellowish and marked with brown to fuscous; base of tylus,

an arc each side on front, two spots on vertex, posterior margins of calli, vaguely on pronotal disk, except median line and lateral margins, basal angles of scutellum, apical half of corium, and clavus, more or less brownish to fuscous; membrane fuscous, veins pale; apical half of hind femora fuscous. The female is sometimes darker approaching the coloration of the male.

Breeds on willow (Salix sp.) where it is often abundant. It is apparently recorded only from New York, Connecticut, Ohio, and Texas.

Meridian, April 28, 1931, (H. G. Johnston).

Orthotylus viridis Van Duzee.

Proc. Cal. Acad. Sci., ser. 4, vi, 103, 1916.

Male. Length 4.6 mm., width 1.4 mm.; pale green to greenish yellow; head, pronotum anteriorly, embolium and femora, yellowish; antennae yellowish, segments I, III, and IV, somewhat fuscous; tylus with small, fuscous spot at base; rostrum reaching to middle of intermediate coxae; membrane pale fuscous, veins pale greenish; clothed with prominent yellowish hairs; genital claspers distinctive.

Female slightly larger and more robust but very similar to male in coloration and pubescence.

Breeds on willow (Salix nigra). Not recorded south of North Carolina.

Wiggins, May 5, Columbia, May 12, Natchez, May 15, Holly Springs, May 23, Booneville, May 26, A. & M. College, May 29, 1931, (H. G. Johnston).

Orthotylus modestus Van Duzee.

Proc. Cal. Acad. Sci., ser. 4, vi, 109, 1916.

Male. Length 4.5 mm., width 1.5 mm.; principally fuscous to black marked with yellow; vertex, embolium, outer basal half of corium, cuneus and often apical half or more of scutellum, yellow to greenish yellow; membrane fuscous, veins scarcely paler; antennae yellowish brown, segment I darker; legs uniformly greenish yellow, tarsi brown; dorsum clothed with prominent, long, yellow hairs; genital claspers distinctive.

Female only slightly larger and more broadly pale; principally pale greenish yellow marked with fuscous or black; spot at base of tylus, arc each side on front, vague spots on vertex near margins of eyes, calli, basal margin of pronotum except lateral angles, basal angles of scutellum, clavus, and a spot on inner apical angle of corium, fuscous to black; membrane, pubescence and legs similar to male.

Breeds on Salix nigra. Recorded only from New York, Ohio, Pennsylvania, and Washington, D. C.

Wiggins, May 5, A. & M. College, May 6 and 29, Natchez,

May 15, Holly Springs, May 23, Booneville, May 26, 1931, (H. G. Johnston).

Genus Diaphnidia Uhler, 1895.

Elongate, delicate species with the front of head subvertical, slightly longer than width of vertex; rostrum usually reaching or surpassing posterior coxae, first segment not reaching beyond hind margin of head; lateral margins of pronotum practically straight, disk with a shallow impressed line behind the calli; hemelytra subhyaline, almost flat, embolar margin somewhat reflexed.

Key to Species.

1. Head and first antennal segment fuscous to black . . . . . capitata

   Head and first antennal segment pale to greenish . . 2

2. Hemelytra with numerous dark green spots . . . . bella

   Hemelytra uniformly pale greenish white . . pellucida

Diaphnidia pellucida Uhler.

Col. Agr. Expt. Sta., Bul. 31, Tech. Ser. No. 1, 44, 1895.

Male. Length 3.9 mm., width 1.09 mm.; uniformly pale, greenish white, legs and antennae included; eyes and tip of tarsi somewhat fuscous; sparsely clothed with simple, erect, prominent pubescence.

Female. Slightly larger but otherwise similar to male.

Breeds principally on oaks but occasionally found on other hardwoods. In the east not recorded south of Maryland.

Carthage, May 20, 1926, Tupelo, May 25, A. & M. College, May 29, 1931 (light trap), (H. G. Johnston).

Diaphnidia capitata Van Duzee.

Bul. Buffalo Soc. Nat. Sci., x, 490, 1912.

Male. Length 3.0 mm., width 1.01 mm.; general color pale greenish white; hemelytra translucent; head fuscous to black, shining, eyes reddish brown to gray; antennae brownish white, first segment fuscous to black, second fuscous at apex and sometimes at base also; dorsum sparsely clothed with prominent, simple, erect pubescence.

Female slightly larger but otherwise similar to male.

Breeds on beech (Fagus ferruginea). Recorded from Ontario, Minnesota, and New York.

Poplarville, May 11, Tchula, May 18, Water Valley, May 12, 1931, (H. G. Johnston).

Diaphnidia bella (Van Duzee).

University California Pub., Tech. Bul., i, No. 4, 217, 1916.

Male. Length 2.68 mm., width 1.05 mm.; greenish yellow; the hemelytra marked with irregular green spots; head

short, subvertical, front strongly convex, somewhat flattened at base; antennae a uniform yellowish green; pronotum short broad, with a distinct transverse impression behind the calli; mesoscutum broadly exposed; hemelytra clear translucent marked with irregular yellowish-green to green spots, cuneus and areoles with blue-green spots; legs slender, tibial spines prominent, brownish; dorsum sparsely clothed with prominent, simple, yellow pubescence.

Female slightly larger but similar to male.

Breeds on wild grape (Vitis vulpina).

This is evidently the species described by Van Duzee as Hyalochloria bella, although the vertex is not distinctly excavated and the tibiae have distinct spines. For this reason it should be placed in the genus Diaphnidia. It is recorded only from San Diego County, California.

Columbia, Aug. 6, 1929, (H. G. Johnston).

Genus Reuteria Puton, 1875.

Elongate, pubescent species having the head porrect, only slightly declivent at apex, vertex ecarinate; eyes large, inner margins parallel; pronotum with distinct impressed line behind calli, posterior margin truncate, basal angles rounded. One species is known.

Reuteria irrorata (Say).

Complete Writings, i, 346, 1859.

Male. Length 3.8 mm., width 1.2 mm.; pale greenish white usually marked with irregular bluish-green spots; head, pronotum and scutellum uniformly whitish; antennae white to yellowish, first segment with a longitudinal black line on inner and outer surfaces connected beneath near apex; hemelytra greenish, usually marked with irregular blue-green spots, membrane pale, iridescent, veins green; rather densely clothed with prominent, simple pubescence.

Female slightly larger but otherwise similar to male.

Breeds abundantly on Quercus alba.

Carthage, June 7, 1926, Crawford, June 15, Columbus, June 20, Rolling Fork, July 23, 1929, (H. G. Johnston).

Genus Heterocordylus Fieber, 1868.

Elongate, robust species having the head triangular, strongly declivent, vertex strongly carinate and fitting closely against anterior margin of pronotum; antennal segment II incrassate, fusiform; pronotal disk margined at sides; sparsely clothed with closely appressed scale-like pubescence and intermixed with fine, simple, suberect hairs.

Heterocordylus malinus Reuter.

Acta Soc. Sci. Fenn., xxxvi, No. 2, 71, 1909.

Male. Length 5.8 mm., width 2.1 mm.; black, broadly marked with red above; head black, eyes red; pronotum red, except calli and anterior to calli, black; scutellum black; hemelytra red, apical half of clavus and spot on apex of corium fuscous to black, membrane black; clothed with fine, yellowish, simple pubescence and intermixed with scattered tufts of silvery white, deciduous, scale-like pubescence.

Female slightly larger and more broadly red than the male.

Specimens from the South and Southwest are much more broadly red than specimens from the northern states.

Breeds on Crataegus.

Tupelo, May 26, 1931, (H. G. Johnston).

Tribe Ceratocapsini.

Key to Genera.

1. Scutellum strongly convex or conically produced upward . . . . . Cyrtopeltocoris

   Scutellum not strongly convex 2

2. Pronotum anterior to middle subcylindrical, abruptly flaring behind middle, basal half of disk strongly convex . . . . . Pamillia

   Pronotum in our species not subcylindrical on anterior half, its sides not constricted at middle . . . . . Ceratocapsus

Genus Ceratocapsus Reuter, 1876.

Oblong-oval species with head short, broad, its front strongly declivent; eyes large, almost in contact with anterior angles of pronotum; beak slender reaching or surpassing intermediate coxae; antennae stout, segment I but little or no thicker than others; pronotum with sides usually regularly narrowed anteriorly, its sides not constricted at middle, calli indistinct, hind margin truncate or broadly rounded, covering the mesoscutum. Eleven species are known to occur in Mississippi.

Key to Species.

1. Clothed only with simple pubescent hairs 2
   Clothed with more or less closely appressed scale-like pubescence and intermixed with erect, simple hairs 5
2. Head largely and antennae at least in part, bright red; dorsum uniformly pale straw yellow 3
   Head and antennae not bright red; dorsum more or less darkened 4
3. Antennae and hind tibiae unfformly bright red . . . . . rubricornis
   Antennal segments I and II in great part, and hind tibiae unfformly, straw yellow . . . . . bifurcus

4. Hemelytra with embolar margins nearly straight, on basal two-thirds subparallel, beset with few long erect hairs . . . . . modestus

Hemelytra with embolar margins broadly arcuate throughout, densely clothed with fine, suberect, simple pubescence . . . . . barbatus

5. Pronotum punctate, sometimes finely but distinctly so 6

Pronotum impunctate; dorsum uniformly reddish, antennae yellowish, segment IV reddish brown . . . . . taxodii

6. Antennal segment II in length equal to or greater than width of head plus dorsal width of an eye . . 8

Antennal segment II, in length not equal to width of head plus dorsal width of an eye 7

7. Antennal segment II of uniform thickness throughout; setigerous punctures fuscous, quite conspicuous . . . . . rufistigmus

Antennal segment II clavate, much more slender on basal half; setigerous punctures not comspicuous . . . . . uniformis

8. Pronotum with two conspicuous brown spots, one behind each callus; simple pubescence long, erect . . . . . complicatus

Pronotum without conspicuous brown spots 9

9. Apical two-thirds of membrane fuscous, pale within areoles and bordering apex of cuneus . . fuscosignatus

Membrane uniformly fuscous 10

10. Smaller, length, female 2.5 mm., male 3.1 mm.; simple pubescence sparse, long and erect . . . . . setosus

Larger, length 3.9 mm.; simple pubescence very fine, thick and suberect . . . . . fuscinus

Ceratocapsus rubricornis Knight.

Ohio Jl. Sci., xxvii, 145, 1927.

Male. Length 4.3 mm., width 1.8 mm.; uniformly yellowish, except head, antennae, propleura above coxal cleft, and hind tibiae, bright red; antennal segments III and IV darker red; sparsely clothed with yellow, suberect, simple pubescence. Genital claspers distinctive.

Female slightly larger than male but similar in coloration and pubescence.

Feeding habits unknown. Recorded only from Mississippi. A. & M. College, June 22, 1921, (C. J. Drake); Carthage, June 23, 1929, (H. G. Johnston).

Ceratocapsus bifurcus Knight.

Ohio Jl. Sci., xxvii, 144, 1927.

Male. Length 4.0 mm., width 1.7 mm.; general color nearly uniformly yellow; head, apical one-third of antennal segment II, segments III and IV, and two lines above base of coxal cleft, bright red; vertex broadly but shallowly

concave; clothed with rather long, suberect, yellow hairs. Genital claspers distinctive.

Female similar to male in coloration and pubescence.

Feeding habits unknown. Recorded only from Florida.

Wiggins, May 29, 1931, (J. P. Kislanko).

Ceratocapsus complicatus Knight.

Ohio Jl. Sci., xxvii, 148, 1927.

Male. Length 3.2 mm., width 1.3 mm.; yellowish brown to dark brown, the pronotum paler and with two dark brown spots one behind each callus; legs and antennae pale yellowish brown, segments III and IV reddish brown; dorsum finely, closely punctate, the punctures coarser on the pronotum; clothed with recumbent, silvery scale-like pubescence and intermixed with long, erect, setose hairs; membrane fuscous, veins brown. Genital claspers distinctive.

Female similar to male in coloration and pubescence.

Breeds on cypress (Taxodium distichum).

Columbus, July 24, 1921, (C. J. Drake); Rolling Fork, July 23, Cary, July 27, 1929, (H. G. Johnston).

Ceratocapsus modestus Uhler.

Ent. Amer. iii, 69, 1887.

Male. Length 4.3 mm., width 1.8 mm.; general color reddish yellow to dark fuscous brown; head, thorax and basal half of hemelytra reddish yellow; abdomen and apical half of hemelytra dark brown to fuscous, often the entire body

becomes a nearly uniform fuscous brown; antennae brown to fuscous, first segment yellow; legs yellow, hind tibiae and tarsi reddish brown, hind femora somewhat reddish brown; dorsum finely alutaceous; clavus, scutellum and inner apical margin of corium with few, long, erect hairs but without recumbent, scale-like hairs. Genital claspers distinctive.

Female very similar to male in coloration and pubescence.

Breeds on grape (Vitis sp.).

Scott, August 4, 1925, Laurel, August 14, 1929, (H. G. Johnston); Wiggins, May 29, 1931, (J. P. Kislanko).

Ceratocapsus barbatus Knight.

Ohio Jl. Sci., xxvii, 150, 1927.

Male. Length 3.6 mm., width 1.5 mm.; uniformly yellowish brown; antennal segments III and IV reddish brown; embolar margins broadly, evenly arcuate throughout its length; dorsum densely clothed with prominent, suberect, simple, brown pubescence; eyes distinctly pubescent. Genital claspers distinctive.

Female slightly larger than male and uniformly dark reddish brown to brown in color, antennae as in male; embolar margins strongly arcuate, much more so than in the male; pubescence similar, slightly darker than in the male.

Breeds on Pinus taeda. Not recorded south of Maryland.

Carthage, June 7, 1930, West Point, June 19, 1929, (H. G. Johnston); Wiggins, May 29, 1931, (J. P. Kislanko).

Ceratocapsus taxodii Knight.

Ohio Jl. Sci., xxvii, 143, 1927.

Male. Length 2.9 mm., width 1.2 mm.; color a nearly uniform reddish brown to dark brown; legs and antennae uniformly yellowish brown except antennal segment IV, reddish brown; dorsum impunctate, finely alutaceous; membrane fuscous, somewhat paler at base; clothed with closely appressed, silvery, scale-like pubescence and intermixed with rather long, suberect, simple, yellow, pubescent hairs. Genital claspers distinctive.

Female similar to male in size, coloration and pubescence.

Breeds on cypress (Taxodium distichum).

Vicksburg, July 18, Durant, July 15, Port Gibson, July 22, Natchez, July 23, Columbus, July 24, 1921, (C. J. Drake); Catchings, June 29, Anguilla, July 3, Rolling Fork, July 23, Columbia, August 6, 1929, (H. G. Johnston).

Ceratocapsus rufistigmus Blatchley.

Heteroptera Eastern N. Amer., p. 829, 1926.

Male. Length 3.1 mm., width 1.2 mm.; nearly uniformly reddish brown; antennal segment I yellowish, an elongate red spot near base; legs yellow, apex of femora and tibiae red; dorsum, except head, densely punctate with fuscous

punctures, each puncture bearing a very small, inconspicuous, silvery, scale-like hair, these intermixed with very prominent, suberect, yellow, simple hairs which arise between the punctures; eyes distinctly pubescent. Genital claspers distinctive.

Female similar to male in coloration and pubescence.

Collected on ferns. Recorded only from Dunedin, Florida.

Vicksburg, July 27, Natchez, July 31, 1929, (H. G. Johnston).

Ceratocapsus fuscinus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 531, 1923.

Male. Length 3.9 mm., width 1.5 mm.; color a hearly uniform dark reddish brown, pronotum and scutellum darker, embolar margins yellow, cuneus reddish; antennal segments I and II, yellow, III and IV, fuscous to brown; legs yellow, apex of hind femora reddish; clothed with fine, yellow, simple, suberect pubescence and intermixed with closely appressed, scale-like pubescence; membrane fuscous; veins yellowish. Genital claspers distinctive.

Female similar to male but embolar margins strongly arcuate; color more yellowish, pronotum often yellowish with calli and a ray across top of coxal cleft blackish.

Breeds on willow (Salix nigra). Not recorded south of Maryland and Indiana.

Natchez, May 15, 1931, Anguilla, July 3, Brookhaven, Aug. 3, Columbia, August 6, West Point, June 19, Holly Springs, May 23, 1929, (H. G. Johnston).

Ceratocapsus uniformis Knight.

Ohio Jl. Sci., xxvii, 147, 1927.

Male. Length 3.2 mm., width 1.6 mm.; nearly uniformly dark reddish brown, darker on anterior half of pronotum and somewhat paler on posterior margin; pronotum and hemelytra rather finely, distinctly punctate; antennae yellow, segments III and IV, fuscous; legs yellow, apex of hind femora reddish brown; membrane uniformly fuscous brown; dorsum sparsely clothed with fine, yellow, simple pubescence and intermixed with fine, silvery, scale-like pubescence. Genital structure distinctive, a small tubercle on lateral margin of genital segment above base of left clasper.

Female similar to male in coloration, punctuation, and pubescence.

Corinth, July 9, Columbus, July 24, 1921, (C. J. Drake); Rolling Fork, July 23, Vicksburg, July 27, Port Gibson, July 29, 1929, (H. G. Johnston).

Ceratocapsus setosus Reuter.

Acta Soc. Sci. Fenn., xxxvi, No. 2, 70, 1909.

Male. Length 3.1 mm., width 1.3 mm.; a nearly uniform reddish brown color, head, posterior half of pronotum

and clavus sometimes yellowish; antennae yellow, first segment with a bright red spot on inner surface near base, segments III and IV, reddish brown; legs uniformly yellow; membrane uniformly fuscous brown; pronotum and hemelytra finely, densely but distinctly punctate, scutellum transversely rugulose with but few scattered punctures; pronotum and hemelytra clothed with closely appressed scale-like pubescence and intermixed with long, erect, setose hairs. Genital claspers distinctive.

Female. Length 2.2 mm., width 1.2 mm.; brachypterous, the hemelytra scarcely surpassing tip of abdomen, their apices broadly rounded, membrane almost absent, the clavus scarcely distinct from corium; similar to male in coloration, punctuation, and pubescence.

Collected on sedges. Not previously recorded from Mississippi.

Carthage, May 2, Corinth, May 23, 1931, (H. G. Johnston).

Ceratocapsus fuscosignatus Knight.

Ohio Jl. Sci., xxvii, 149, 1927.

Male. Length 2.95 mm., width 1.0 mm.; a nearly uniform brownish yellow, head often, and scutellum, fuscous to brown; membrane fuscous on apical half, pale within areoles and bordering apex of cuneus; antennae yellow, fourth segment dusky to fuscous; legs pale yellow, apex of hind femora and tibiae brownish yellow; pronotum and hemelytra densely,

finely, indistinctly punctate, the punctures not infuscated; clothed with fine, yellow, simple pubescence and intermixed with fine, silvery, scale-like pubescence. Genital claspers distinctive.

Female similar to male in coloration, punctuation, and pubescence.

Female (brachypterous form). Length 2.1 mm., width 1.0 mm.; hemelytra not reaching to apex of abdomen, broadly rounded at apex, cuneal fracture distinct, membrane scarcely reaching apex of cuneus; coloration, punctuation, and pubescence similar to male.

Host relationship unknown. Not previously recorded from Mississippi.

Vicksburg, July 27, 1929, (H. G. Johnston).

Genus Cyrtopeltocoris Reuter, 1876.

Elongate species having the head short, strongly and suddenly constricted behind the eyes; antennae stout, segments II and III about equal in thickness, almost equal to thickness of segment I; pronotum strongly convex, anterior margin strongly and suddenly constricted to form a rather broad, flattened collar; scutellum strongly convex or conically produced; hemelytra with costal margins broadly sinuate.

Cyrtopeltocoris gracilentis Knight.

Ent. News, xli, 321, 1930.

Male. Length 3.7 mm., width 1.1 mm.; dark reddish brown with broad white band extending across clavus midway between apex of scutellum and tip of clavus and extending upon corium to radial vein; also a white bar on apex of corium bordering cuneus; membrane and veins uniformly fuscous; legs reddish brown, middle and hind coxae, and trochanters pale; scutellum conically produced dorsally, almost reaching the height of the pronotum; clothed with very fine, short, pale pubescence, intermixed with a few long, erect, pale hairs.

The female is unknown.

Recorded only from Eufaula, Alabama, the type locality.

A. & M. College, May 29, 1931, (H. G. Johnston); collected at trap light.

Genus Pamillia Uhler, 1887.

Elongate, narrow species having the head long, the front slightly convex and strongly declivitous; antennae stout and of nearly equal thickness throughout; pronotum with anterior half subcylindrical, abruptly flaring to basal angles, basal half of disk strongly convex; embolar margins parallel on basal half often suddenly expanded and

broadly curved on apical half, cuneal fracture deep.

Pamillia davisi Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 535, 1923.

Male. Length 2.85 mm., width 1.0 mm.; color a nearly uniform dark reddish brown, disk of pronotum and apex of corium and cuneus darker; front of head nearly vertical, scarcely convex; antennal segment I and basal half of II, yellowish; rostrum reaching apex of hind coxae; pronotum strongly convex on basal half, declivitous behind, posterior margin broadly arcuate; scutellum rather strongly convex; hemelytra with embolar margins nearly parallel, not abruptly flaring on apical half, apical third of corium and cuneus polished, shining, a pale pruinose band on middle of corium just before the shining area, membrane dark brown, veins inconspicuous; dorsum sparsely clothed with rather long, erect, yellow hairs.

One specimen, a male, taken at Laurel, Aug. 14, 1929, (H. G. Johnston) on grasses growing in a pine woods. This specimen evidently represents the male of P. davisi which was previously unknown. P. davisi is known only from two female specimens taken at Lakehurst and Manumuskin, N. J. The male described here differs somewhat from the original description of the female in being smaller, the rostrum slightly longer, the scutellum decidedly convex, and the embolar margins only slightly expanded on apical half.

Tribe Pilophorini.

Key to Genera (Knight, 1923).

1. Vertex compressed posteriorly, slightly overlapping the pronotum; length of antennal segment I not exceeding width of vertex; posterior tibiae usually compressed 2

   Vertex not compressed posteriorly; length of antennal segment I nearly equaling width of head; posterior tibiae cylindrical; anterior half of pronotum constricted, its sides at that point nearly parallel . . . . . Pseudoxenetus

2. Antennal segment II scarcely thickened toward apex; width of head across eyes greater than width of pronotum at base; hemelytra with embolar margins parallel . . . . . Alepidia

   Antennal segment II thickened toward apex; width of head less than width of pronotum at base; hemelytra, medially coarctate, with white pubescent bands . . . . . Pilophorus

Genus Pseudoxenetus Reuter, 1909.

Elongate, slender, glabrous species with head somewhat exserted, front declivent; pronotum campanulate, the

apical half subcylindrical, the posterior half broad, strongly convex with the basal margin broadly sinuate; hemelytra with embolar margins broadly sinuate, clavus long, the commissure more than twice the length of scutellum.

Pseudoxenetus regalis (Uhler).

Trans. Md. Acad. Sci., i, 80, 1890.

Length 6.5 mm., width 2 mm.; general color reddish brown to dark brown; posterior half of pronotum, sternum and pleura largely red, scutellum usually black or dark brown though often yellowish white; hemelytra brown with a white translucent band on base of cuneus; legs brown, posterior coxae yellow to red; dorsum completely glabrous. Sexes similar.

Breeds on Quercus virginiana and other species of oak.

Landon, April 15, Lucedale, April 24, Meridian, April 28, Carthage, May 2, 1931, (H. G. Johnston).

Pseudoxenetus regalis scutellatus (Uhler).

Trans. Md. Acad. Sci., i, 81, 1890.

This variety differs from regalis in having the posterior half of pronotum, sternum and pleura reddish brown to dark brown or black, the scutellum is usually yellowish although sometimes only on the apex.

Breeds on Quercus virginiana and other species of oak. Found in the same localities as regalis.

Scutellatus was described by Uhler as a distinct species

but it is evidently only a variety of regalis. Teneral specimens of scutellatus have the basal half of the pronotum, pleura and sternum reddish as in regalis, and the scutellum is sometimes almost black. All the specimens of regalis collected in Mississippi have the scutellum white as in scutellatus.

Genus Alepidia Reuter, 1909.

Elongate, narrow species with the head very broad, width across eyes exceeding width of pronotum at base, vertex compressed posteriorly slightly overlapping the pronotum; antennal segment II rather slender, slightly enlarged near apex; hemelytra with sides subparallel, the cuneus nearly horizontal.

Alepidia gracilis squamosa Knight.

Bul. Brooklyn Ent. Soc., xxi, 26, 1926.

Male. Length 3.6 mm., width 1.2 mm.; reddish brown to black, slightly shining; head, pronotum and scutellum dark brown to black; hemelytra reddish brown to black, with patches of silvery scale-like pubescence, one patch near base of corium and two patches near middle of corium; scutellum with three such patches of scale-like pubescence, one near each basal angle and one on apex; these patches easily rubbed off and often absent; legs and antennae yel-

lowish; abdomen each side near base with a patch of scale-like pubescence.

Female slightly larger but otherwise similar to male.

Breeds on Pinus taeda.

West Point, June 19, 1923, (H. G. Johnston).

Genus Pilophorus Hahn, 1826.

This genus is similar to Alepidia and differs mainly in having the width of head less than width of pronotum at base; hemelytra with embolar margins strongly sinuate, cuneus strongly deflexed; antennal segment II thickened toward apex; hind tibiae usually flattened and more or less curved.

Key to Species.

1. Hemelytra polished over entire width behind the posterior line of silvery scale-like hairs 2
   Hemelytra polished behind posterior silvery line but exterior to radial vein only 4
2. Hemelytra dark fusco-brownish on basal half . .vanduzeii
   Hemelytra bright cinnamon fulvous on basal half . . . 3
3. Antennal segment II strongly clavate on apical third, in length exceeding distance between tip of tylus and base of pronotum . . . . . laetus
   Antennal segment II gradually thickened from middle

toward apex, in length not equal to distance between tip of tylus and base of pronotum . . juniperi

4. Rostrum short, scarcely attaining hind margin of the mesosternum . . . . . walshii

Rostrum longer, attaining posterior margin of middle coxae . . . . . australis

Pilophorus vanduzeii Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 540, 1923.

Male. Length 4.5 mm., width 1.5 mm.; general color dark brown; pronotum and scutellum almost black; front of head, anterior half of pronotum and apex of scutellum sparsely clothed with silvery, scale-like pubescence which is easily rubbed off and often absent; scutellum with apex and narrow lateral margins flat, rather strongly convex on basal half; hemelytra dark fusco-brownish sparsely covered with short, erect, black bristles, opaque, shining behind the posterior line of silvery scales; legs uniformly dark brown, a pale spot on anterior face of anterior coxae near base, apex of posterior coxae and trochanters yellowish, posterior tibiae flattened and strongly curved; venter with a patch of silvery, scale-like pubescence laterally on third segment.

Female. Length 5.0 mm., width 1.6 mm.; similar to male but antennal segment III distinctly thicker, almost equal to

thickness of segment I.

Breeds on Pinus taeda. Not recorded south of Maryland.

Tchula, May 18, Winona, May 21, 1931, West Point, June 19, 1929, (H. G. Johnston).

Pilophorus laetus Van D.

Proc. Cal. Acad. Sci., ser. 4, viii, 294, 1918.

Male. Length 3.3 mm., width 1.1 mm.; general coloration reddish brown to black, shining; hemelytra anterior to posterior silvery line cinnamon fulvous, opaque, posterior to this line, black, shining; posterior silvery line interrupted on corium; antennae pale, segment II slender on basal two-thirds, abruptly clavate and black on apical one-third; legs reddish brown, anterior coxae on basal half, and posterior coxae on apical half, white; venter with silvery patch of pubescence on third and fourth segments.

Female similar to male but clavate portion of antennal segment II slightly thicker.

Collected on Pinus taeda. Recorded only from Washington, D. C., Woodbine, N. J., and Alabama.

Union, August 16, 1929, (H. G. Johnston).

Pilophorus juniperi Knight.

Conn. Geol. and Nat. Hist. Survey, Bul 34, 543, 1923.

Male. Length 3.5 mm., width 1.2 mm.; similar to laetus but somewhat darker in color; differs in the shorter and more

gradually thickened antennal segment II which in length is not equal to distance between tip of tylus and base of pronotum and by the narrower head; the venter is dark brownish black with an elongate patch of silvery hairs on segments 3 - 5 inclusive.

Female very similar to male in color and pubescence.

Breeds on red cedar (Juniperus virginiana). Not recorded south of New Jersey.

Columbus, June 20, 1929, (H. G. Johnston).

Pilophorus walshii Uhler.

Ent. Amer., iii, 30, 1887.

Male. Length 3.3 mm., width 1.2 mm.; general coloration dull, fuscous brown, the hemelytra yellowish brown except polished areas; antennae reddish brown, basal third of segment III yellowish, segment II dark brown at apex, in length not equal to distance between tip of tylus and base of pronotum; rostrum short, scarcely attaining posterior margin of mesosternum; hemelytra with posterior silvery line interrupted and projected forward on clavus, not forming a straight line, clavus polished behind posterior silvery line but corium polished only exterior to radial vein, cuneus polished and with an elongate, silvery patch of scale-like hairs on inner basal margin, membrane pale fuscous with dull brown spot adjoining cuneus and extending considerably beyond the apex of areoles; legs reddish brown, coxae and trochanters largely

yellow.

Female similar to male in coloration and pubescence.

Breeds on honey locust (Gleditsia triacanthos). Not recorded south of Washington, D. C. This species is easily distinguished from allied forms by the short rostrum.

Rolling Fork, July 23, 1929, (H. G. Johnston).

Pilophorus australis Knight.

Bul. Brooklyn Ent. Soc., xxi, 21, 1926.

Male. Length 3.4 mm., width 1.3 mm.; general coloration dull reddish brown, the hemelytra, except the polished portion of corium and cuneus, yellowish brown; antennae reddish brown, basal third of segment III yellowish, segment II fuscous at apex, in length not equal to distance between tip of tylus and base of pronotum; rostrum attaining posterior margins of intermediate coxae; hemelytra with posterior silvery line interrupted and projected forward on clavus, not forming a straight line, clavus polished behind posterior silvery line but corium polished only exterior to radial vein, cuneus polished and with an elongate, silvery patch of scale-like hairs on inner basal margin; membrane pale fuscous with dull brown spot adjoining cuneus and extending over most of basal half; legs yellowish-brown, apex of coxae and trochanters pale.

Female similar to male in coloration and pubescence.

Breeds on willow (Salix spp.).

Wiggins, May 29, 1931, (J. P. Kislanko); West Point, June 19, Catchings, June 29, Anguilla, July 3, 1929, (H. G. Johnston).

Tribe Systellonotini.

Genus Sericophanes Reuter, 1876.

Elongate, slender, subglabrous species having head almost as broad as pronotum at base, front subvertical, vertex carinate; antennal segments of nearly equal thickness; thorax campanulate, the apex of pronotum but little wider than vertex, basal portion strongly convex, truncate on basal margin; hemelytra medially coarctate; ostiolar peritreme projecting to form a prominent, blunt tubercle; female brachypterous, abdomen narrow at base, very broad at middle.

Sericophanes ocellatus Reuter.

Ofv. Svenska Vet. - Akad. For., xxxii, No. 9, 79, 1876.

Male. Length 3.2 mm., width .96 mm.; general color yellowish brown to light fuscous brown; head, antennae, pronotum, scutellum and legs rather uniformly fuscous brown, posterior coxae pale yellow; hemelytra yellowish brown with three silvery spots extending upon corium from costal margin,

the basal one extending upon clavus, clavus with creamy yellow spot just beyond apex of scutellum, membrane fuscous, a pale band across basal half near middle of cuneus.

Female. Length 2.6 mm., width of abdomen .96 mm.; brachypterous, the wings scarcely reaching posterior margin of second abdominal tergite; the membrane absent and only two silvery spots present; distinctly ant-like in form, the pronotum subglobose; abdomen strongly constricted at base, but more than three times as broad at middle; coloration similar to male.

Occurs on upland grassy ridges, the males often taken at lights. Most of the records for this species from the eastern states probably refer to heidemanni Poppius, a larger and darker colored species.

Wiggins, April 25 and May 5, 1931, (H. G. Johnston).

Subfamily Mirinae.

Key to Genera.

Head strongly exserted; pronotum with sides not margined . . . . . Collaria

Head not exserted; eyes in contact with pronotal angles; pronotum with lateral margins distinctly expanded . . . . . Trigonotylus

Genus Collaria Provancher, 1872.

Elongate, slender, pubescent species with head strongly exserted, porrect, front strongly declivent; eyes placed near its middle; vertex with median longitudinal groove, and transverse impression back of eyes; pronotum subcampanulate, front lobe subcylindrical, calli prominent, hind lobe broad, finely and closely punctate, disk with a velvety black spot near each basal angle; hemelytra with sides subparallel, slightly wider behind middle.

Collaria occulata (Reuter).

Ofv. Svenska Vet. - Akad., xxxii, No. 9, 61, 1876.

Male. Length 5.8 mm., width 1.5 mm.; general color dull yellowish brown with fuscous; front of head and antennae reddish brown, shining; front lobe of pronotum and scutellum dark brown to fuscous, hind lobe distinctly lighter in color with velvety black spots clearly defined, a narrow pale median carina extending full length of pronotum and extending as a pale line upon scutellum; hemelytra yellowish brown, irregularly clouded with fuscous on corium and clavus, embolium pale translucent; legs yellow, irregularly spotted with brown.

Female slightly larger but very similar in coloration.

Breeds on several species of grasses in dry, sandy meadows throughout the state.

Corinth, May 25, West Point, June 19, Ackerman, August 19, Louisville, June 15, Carthage, August 17, Newton, August 15, Port Gibson, July 29, Columbia, August 6, Tylertown, August 5, Wiggins, May 5, Laurel, August 14, 1929, (H. G. Johnston).

Genus Trigonotylus Fieber, 1858.

Elongate, slender, nearly glabrous species having the head porrect, inserted in thorax to the eyes, front projecting sharply beyond the bases of antennae, median sulcus distinct; pronotum with lateral carinae prominent; mesoscutum broadly exposed with a deep fovea on each basal angle; hemelytra somewhat hyaline, sparsely clothed with inconspicuous, recumbent hairs.

Key to Species.

First antennal segment equal to or slightly greater than length of head. Color greenish-yellow with a roseate tinge; head with three, pronotum with four, and scutellum with two, longitudinal reddish-brown stripes . . . . . pulcher

First antennal segment distinctly shorter than length of head. Color a nearly uniform greenish yellow, sometimes with faint brown stripes as in pulcher . . . . . brevipes

Trigonotylus pulcher Reuter.

Ofv. Svenska Vet. - Akad. Forh., xxxii, No. 9, 59, 1876.

Length 4.8 mm., width 1.1 mm.; pale greenish yellow usually with a roseate tinge; head, pronotum, and scutellum with reddish-brown stripes as in the key; first antennal segment equal to or slightly longer than head; hemelytra pale greenish white with distinct roseate tinge on clavus and corium; legs green, last tarsal segment fuscous.

Sexes similar in size and coloration.

Breeds on bermuda grass (Cynodon dactylon) and other grasses.

West Point, June 19, Crawford, June 15, Yazoo City, July 27, Valley, July 26, 1929, (H. G. Johnston); A. & M. College, (Weed).

Trigonotylus brevipes Jakovlef.

Troudy Russk. Ent. xi, 215, 1880.

Length 4.4 mm., width 1.0 mm.; color a nearly uniform pale greenish yellow, sometimes with a faint roseate tinge; antennae often reddish, segment I slightly but distinctly shorter than head; pronotum and scutellum often with faint brown to fuscous stripes as in pulcher; apex of hind tibiae and tarsi reddish to fuscous.

Sexes very similar in size and coloration.

Breeds on bermuda grass (Cynodon dactylon).

Rolling Fork, July 23, Valley, July 26, Vicksburg, July 27, Carthage, August 27, 1929, (H. G. Johnston).

Subfamily Capsinae.

Key to Tribes (Knight, 1923).

1. Slender, ant-like species, abdomen constricted at base; lateral margins of pronotum indistinct, more or less sinuate; hemelytra medially coarctate . . . . . Myrmecorini

Form not ant-like, abdomen not distinctly constricted; pronotum with lateral margins distinct, frequently finely carinate; hemelytra with embolar margins straight or slightly arcuate . . . 2

2. Ostiolar peritreme small, poorly developed; its dorsal margin scarcely extending dorsad as far as ventral margin of epimeron of mesothorax; tibiae usually destitute of spines but sometimes strongly nigro-pubescent; body impunctate; pronotal collar broad, strongly convex, width of collar (measured cephalocaudally) usually as great as width of calli; genae high; head vertical, rarely inclined; segment I of hind tarsi twice as long and thicker than second . . . . . Resthenini

Ostiolar peritreme prominent, its dorsal margin extending well above ventral margin of epimeron of mesothorax; tibiae bearing rows of spines, sometimes rather fine; dorsum frequently punctate; pronotal collar not so broad and prominent as above; genae of medium height or low, rarely high but in such case the vertex, frons, and tylus are subconfluent in a wide arc, the gula long; segment I of hind tarsi rarely longer than segment II, but if so, never thicker than segment II . . . . . Capsini

Tribe Resthenini.

Key to Genera.

1. Stricture of pronotal collar joining base of coxal cleft; head when viewed from the side oblique, gula rather long, oblique . . . . . Opistheuria

Stricture of pronotal collar interrupted at side, not joining directly with base of coxal cleft; head short, vertical, gula short, scarcely apparent 2

2. Front tumid, projecting prominently above the base of tylus; anterior-lateral margins of pronotum carinate to behind calli . . . . . Oncerometopus

Front and vertex more or less convex, the front not

tumid and projecting prominently above the base of tylus; lateral margins of pronotum not carinate . . . . . Platytylellus

Genus Oncerometopus Reuter, 1876.

Elongate-oval, red and black species having the head vertical and about as long as broad, the front tumid and projecting prominently above the base of tylus, the tylus perpendicular, broadly convex, genae high, gula short, scarcely visible; pronotal stricture interrupted at side and not joining base of coxal cleft, anterior-lateral margins carinate to behind calli; body impunctate; tibiae with short black spines.

Oncerometopus nitens Knight.

Jl. N. Y. Ent. Soc., xxxvi, 192, 1928.

The original description is given below.

"Bright red, clavus and corium inside the radial vein black, strongly shining; distinguished by the long second antennal segment.

"Male. Length 4.8 mm., width 2 mm. (larger specimens 5.6 mm.). Head: width .98 mm., vertex .49 mm.; frons less prominent than in nigriclavus. Rostrum: length 2.04 mm., reaching upon third ventral segment. Antennae: segment I, length .35 mm.; II, 2.07 mm., thickness .133 mm., slightly

exceeding thickness of segment I; III, .65 mm.; IV, .71 mm. Pronotum: length 1.03 mm., width at base 1.54 mm.; lateral margins slightly sinuate, basal margin strongly rounded.

"Bright red, distinctly shining; antennae, tylus, base of vertex and more or less on frons, clavus, corium except exterior to the radial vein, cuneus except narrowly at fracture, membrane, femora except basal half of hind pair, and spot on sternum, black. Pubescence yellowish on the red areas, elsewhere black.

"Female. Length 5.4 mm., width 2.1 mm. Head: width 1.03 mm., vertex .56 mm. Antennae: segment I, length .38 mm.; II, 1.70 mm., more slender than segment I, tapering to more slender at base; III, .80 mm.; IV, broken. Pronotum: length 1.11 mm., width at base 1.72 mm. Very similar to the male in coloration."

Poplarville, July 7, Woodville, July 25, Biloxi, July 30, Pascagoula, August 8, 1921, (C. J. Drake).

Genus Opistheuria Reuter, 1907.

Elongate, opaque, impunctate species, the head as long or longer than width through eyes, when viewed from side oblique, gula rather long, oblique; beak reaching middle coxae; pronotum wider at base than long; apex about one-half width of base; hemelytra with costal margins sub-sinuate on

basal half, distinctly arcuate on apical half; legs pilose.

Opistheuria clandestina dorsalis Knight.

Bul. Brooklyn Ent. Soc., xiii, 115, 1918.

Male. Length 6.9 mm., width 2.3 mm.; antennae long, black, and clothed with long, scattered, exserted hairs, and an abundance of short, reclining hairs; general color black, base and ventral portion of head, anterior and lateral margins of pronotum, median vitte on basal half of scutellum, broadly on costal margins of hemelytra, sterna and venter except genital segment, orange red; legs black, coxae and basal half of femora pale to orange red; pubescence fine, yellow.

Female slightly broader than male but otherwise similar.

Often a pest on cultivated beans.

Starkville, June 13, Yazoo City, July 27, Buda, August 2, 1929, (H. G. Johnston).

Genus Platytylellus Reuter, 1907.

Elongate, opaque, impunctate species having head short, broad, vertical, immersed in thorax to eyes, gula short, scarcely apparent; pronotum subcampanulate, apex more than one-half the width of base, stricture of pronotal collar interrupted on side and not joining the base of coxal cleft, sides obtuse not margined, posterior half of disk convex,

declivent, basal margin broadly rounded, hind angles obtuse; hemelytra with embolar margins feebly, broadly curved.

Key to Species.

1. Length of first antennal segment equal to or greater than width of vertex 2

   Length of first antennal segment not equal to width of vertex; disk of pronotum with median red vitta extending to join red scutellum . . . . rubrovittatus

2. Tibiae densely clothed with prominent long hairs, length of certain hairs greater than thickness of segment; male genital segment with a prominent tubercle at base of left clasper, a smaller one at base of right clasper 3

   Tibiae clothed with short hairs, length of hairs not equal to thickness of segment; genital segment without tubercles 4

3. Hemelytra uniformly black; pronotum red, disk on either side of median line and including calli, black . . . . . fraternus

   Hemelytra with lateral margins red or pale, sometimes with red or pale only at base ..varieties of fraternus

   (a) Pronotal disk usually with broad, black, median ray extending from black scutellum to anterior

margin; calli black; lateral margins of hemelytra broadly red or orange . . . var. rubromarginatus

(b) Pronotum and scutellum bright red, scutellum sometimes clouded with fuscous . . var. regalis

4. Head black; pronotum and scutellum uniformly orange . . . . . insitivus

Head red; pronotum red with basal half of disk and scutellum black; venter red . .insignis var. fraterculus

Platytylellus rubrovittatus (Stal).

Stett. Ent. Zeit., xxiii, 318, 1862.

Male. Length 4.5 mm., width 1.8 mm.; black, head except tylus and eyes, pronotum except a broad ray each side of median line extending from calli to posterior margin, scutellum, mesoscutum except outer angles, sterna except spot on each side of the mesosternum, pleura, venter except median ventral area on genital segment and claspers, red or orange-red; legs black, coxae, hind femora except narrowly at base and apex, basal half of middle femora, red or orange; dorsum finely granulate.

Female slightly larger but very similar to male in coloration and pubescence.

Breeds on St. Andrew's cross (Ascyrum hypericoides).

Wiggins, May 5, 1931, Lamont, July 21, 1926, New Augusta, August 12, Union, August 16, 1929, (H. G. Johnston).

Platytylellus insignis fraterculus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 554, 1923.

Male. Length 5.5 mm., width 1.9 mm.; dorsum black, head red, tylus black; pronotum bright red on anterior margin, disk from just behind calli to basal margin, black; scutellum black sometimes tinged with red; hemelytra black somewhat shining, finely granulate, densely clothed with fine, short pubescence; sterna, pleura, and venter, red, genital claspers black; legs black, coxae red.

Female quite similar to male in size, coloration, and pubescence.

Crawford, June 15, Vicksburg, July 27, 1929, (H. G. Johnston).

Platytylellus insitivus (Say).

Complete Writings, i, 340, 1859.

Male. Length 8.8 mm., width 3.6 mm.; black, pronotum, scutellum, prosternum, gula and buccula, orange-yellow; width of collar greater than width of head; dorsum finely granulate, opaque; clothed with short, fine pubescence.

Female quite similar to male in size, coloration, and pubescence.

Wiggins, May 5, Columbia, May 12, 1931, (H. G. Johnston).

Platytylellus fraternus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 557, 1923.

Male. Length 9.1 mm., width 3.4 mm.; antennal segment I clothed with rather long reclining hairs which in length are about equal to thickness of segment; black, head except tylus front and vertex, pronotum except dorsal area of collar, lateral angles of calli and a broad band on disk extending to basal margin, sterna, pleura and venter, red; genital segment with a large tubercle on left side, a smaller one on the right side; rather densely clothed with fine, pale pubescence.

Female quite similar to male in size, coloration, and pubescence.

A. & M. College, May 29, (light trap), Wiggins, May 5, 1931, (H. G. Johnston).

Platytylellus fraternus rubromarginatus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 558, 1923.

Similar to fraternus but with cuneus, embolium, and lateral margins of corium, red or orange-red like the lateral margins of pronotum; pronotal disk sometimes broadly red.

A. & M. College, May 1, 1925, (E. E. Lumpkin).

Platytylellus fraternus regalis Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 559, 1923.

Structurally but little different from fraternus but with the embolium, outer half of cuneus, and outer margin of corium, pale or red, sometimes only tinged with red; head

except eyes, pronotum, and scutellum, red; scutellum sometimes clouded with fuscous or almost black.

Carthage, June 3, 1926, (H. G. Johnston).

Tribe Capsini.

Key to Genera (Adapted from Knight, 1923).

1. Pronotum punctate, sometimes only very finely punctate but usually distinctly so; strongly shining, calli usually prominent 2

   Pronotum impunctate, or with fine aciculate punctures only 8

2. Antennal segment II distinctly thinner at base than apex, sometimes sublinear but then distinctly thinner than segment I 3

   Antennal segment II linear although noticeably thickened, nearly as thick as segment I, entirely sublinear (male) or slightly attenuate toward base (female); both segments bearing heavy, black pubescence 7

3. Pronotum between calli and anteriorly before collar, punctate 4

   Pronotum between calli and anteriorly before collar, impunctate, subelevated 6

4. Lateral margins of pronotum carinate, form more ovate 5

Lateral margins of pronotum ecarinate, form usually elongate and subparallel . . . . . Xenoborus

5. Antennal segment I distinctly thicker than segment II, both segments black; color red and black . . . . . Tropidosteptes

Antennal segment I slender, scarcely equal to thickness of segment II at apex; if colored reddish then antennal segments I and II pale or yellowish . . . . . Neoborus

6. Dorsum nearly glabrous, pubescence very minute, somewhat appressed and scale-like . . . . Neocapsus

Dorsum distinctly, usually densely, pubescent .. Lygus

7. Vertex convex, polished, carina nearly obsolete; form broad and rather convex, distinctly widened behind middle; large red species . . . . Coccobaphes

Vertex with base more flattened, distinctly carinate; body oblong, hemelytra subparallel . . . . . Lygidea

8. Antennal segment I thickened and clothed with numerous flattened hairs . . . . . Neurocolpus

Antennal segment I devoid of flattened hairs 9

9. Pronotum with two subexcavated, opaque black spots located behind the calli; antennal segment I with long black hairs and setae . . . . . Paracalocoris

Pronotum without black spots, or if present, super-

ficial and segment I of antennae without prominent long black hairs or setae; length of hairs on antennal segment I rarely exceeding thickness of segment 10

10. Antennal segment II strongly incrassated, fusiform . . . . . Garganus

Antennal segment II linear or only very slightly thickened at tip 11

11. Hind femora long, extending much beyond apex of abdomen, flattened, broadest before the middle and tapering to apex . . . . . .Phytocoris

Hind femora short, not or scarcely extending beyond tip of the abdomen 12

12. Dorsal surface distinctly pubescent, opaque or nearly so 13

Dorsal surface glabrous, highly polished . . Horcias

13. Body above and below clothed with silky, sericeous or tomentose pubescence . . . . . Polymerus

Body clothed only with simple pubescence 14

14. Head broad, eyes practically in contact with pronotal angles, hind margin of eyes sulcate and forming an arcuate line with base of vertex . . . . . Dichrooscytus

Head not unusually broad, eyes convex behind and well removed from pronotal angles 15

15. Antennal segment I with but few rather long erect bristly hairs; front opaque, distinctly obliquely striate; vertex with narrow, longitudinal, conspicuous sulcus . . . . . Creontiades

Antennal segment I densely clothed with short, black, recumbent hairs and with two or three erect bristly hairs; front polished, indistinctly striate; vertex with shallow, inconspicuous sulcus . . . . . Adelphocoris

Genus Tropidosteptes Uhler, 1878.

Elongate-oval, shining, subglabrous species with head short, subvertical, vertex broadly convex and distinctly carinate at base; pronotum with lateral margins straight and distinctly carinate, calli impunctate, prominent, disk coarsely, deeply punctate, the punctures extending between and in front of the calli, the hind angles and posterior margin broadly rounded, scutellum convex, coarsely, rugosely punctate.

Tropidosteptes cardinalis Uhler.

Proc. Boston Soc. Nat. Hist., xix, 404, 1878.

Length 5.5 mm., width 2.5 mm.; bright red, tylus, rostrum except first segment, antennae, legs except coxae and apices of front and middle femora, a broad band on hemelytra either

side of commissure and membrane, black; rostrum short, scarcely surpassing posterior margin of mesosternum.

Breeds on ash (Fraxinus americana) and occasionally other species of ash.

Carthage, May 2, Water Valley, May 12, Corinth, May 25, 1931, (H. G. Johnston); Wiggins, May 29, 1931, (J. P. Kislanko).

Genus Neoborus Distant, 1884.

Oblong-oval, shining species having head short, its front nearly vertical; eyes prominent, compressed; vertex flat distinctly carinate at base; antennae slender, segment I scarcely equal to thickness of segment II at apex; pronotum with lateral margins straight, carinate, calli prominent, smooth, the area between and in front of them distinctly punctate, behind the calli convex, coarsely irregularly punctate; hemelytra coarsely, irregularly punctate.

Key to Species.

1. Dorsum practically glabrous 2
   Dorsum densely pubescent 5
2. Scutellum uniformly black; dorsum mostly black but with cuneus pale except apically, hemelytra often with a pale spot at base of corium, and sometimes with yellowish markings on head and pronotum . geminus

Scutellum uniformly pale or with distinct pale markings along the lateral margins 3

3. Antennal segment I uniformly black; pronotum rather uniformly yellowish brown . . . . . osmanthicola

Antennal segment I pale or often rather dark brown but then the pronotum not uniformly yellowish brown 4

4. Lateral carinae of pronotum bearing distinct yellowish lines, or if not then the pronotum uniformly yellowish; dorsum usually more or less pale marked with red but sometimes black marked with pale . . . . . amoenus

(a) Chiefly pale, apical area of corium, and usually marks on the pronotum, reddish; membrane pale . . . . . (typical) amoenus

(b) Chiefly black, pronotum without lateral and median vittae; cuneus and often the narrow base of corium pale; scutellum more or less pale yellowish . . . . . (variety) scutellaris

Lateral carinae of pronotum not bearing a distinct yellowish line, concolorous with adjacent margins of pronotal disk and pleura; dorsum yellowish brown marked with darker brown . . . . . glaber

5. Antennal segment I blackish 6

Antennal segment I pale 7

6. Scutellum brownish black each side of median line, basal angles paler; hemelytra reddish brown translucent, cuneus colored similarly to the corium . . . . . rufusculus

Scutellum testaceous, sometimes brownish on middle at base never blackish with median line paler; frequently with clavus bordering scutellum and apical area of corium, fusco-brownish but the cuneus always yellowish translucent . . canadensis

7. Dorsum uniformly black, cuneus clear translucent, legs pale . . . . . tricolor

Dorsum more or less pale; scutellum mostly pale with median black line which usually extends from base to apex; female with embolium and outer margin of corium brownish black while the inner margin of corium is yellowish translucent . . . vittiscutis

Neoborus geminus (Say).

Complete Writings, i, 344, 1859.

Length 4.9 mm., width 2.1 mm.; color a deep, shining black, with cuneus except apex, legs and spots on head, pale; antennal segment I and base of II usually pale but frequently black; pronotum usually black but frequently with the median line, two lateral lines, and basal margin, yellowish; scutellum uniformly black; membrane usually pale

but sometimes fuscous; dorsum glabrous, deeply and coarsely punctate.

Breeds on white ash (Fraxinus americana) and perhaps other ash trees as well. Not recorded south of Virginia, Ohio, and Indiana.

Meridian, April 28, Carthage, May 2, Water Valley, May 12, A. & M. College, May 29, Corinth, May 25, 1931, (H. G. Johnston).

Neoborus amoenus (Reuter).

Acta Soc. Sci. Fenn., xxxvi, No. 2, 48, 1909.

Length 4-5 mm., width 2.1 mm.; color exceedingly variable; usually pale yellowish brown marked with red or fuscous and sometimes with black; antennal segments I and II usually pale, but sometimes brown to fuscous; pronotum usually yellowish brown with four to seven red to fuscous rays, the lateral carinae bearing distinct yellowish lines, scarcely, if at all, wider than the carinae, or if not then the pronotum without red or fuscous rays; scutellum either wholly pale or with distinct pale lateral spots; clavus mostly, and at least apical area of corium, red to fuscous; cuneus, membrane and legs largely pale translucent.

Breeds on several species of ash (Fraxinus). Not recorded south of Maryland and Kansas. This species, with its darker varieties, signatus and scutellaris, is very closely related to geminus.

Carthage, May 2, and June 23, A. & M. College, May 29, 1931; Crawford, June 15, Rolling Fork, July 23, 1929, (H. G. Johnston).

Neoborus amoenus scutellaris (Reuter).

Acta Soc. Sci. Fenn., xxxvi, No. 2, 49, 1909.

Structurally very similar to amoenus but with dorsum piceous black; cuneus and spot on basal half of corium pale translucent; scutellum usually yellow but frequently mostly black with two yellow spots on lateral margins; mesoscutum black; pronotum sometimes with yellow spots behind calli.

Carthage, May 2, Booneville, May 26, Pontotoc, May 27, 1931, (H. G. Johnston).

Neoborus glaber Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 563, 1923.

Length 4.5 mm., width 1.9 mm.; general color yellowish brown marked with darker brown to fuscous; head yellowish, antennae dark brown to fuscous; pronotum with calli and a broad flaring ray behind each callus dark brown, narrow basal margin pale, often ivory white; scutellum brownish to fuscous with basal angles and often the apex yellowish; hemelytra brownish to fuscous, base of embolium, corium and extending along radius yellowish brown; cuneus yellowish, translucent, apical half fuscous to black, membrane fuscous; legs yellowish to brown; dorsum glabrous, coarsely and deeply punctate. Female slightly more robust and paler in color

than the male.

Breeds on Fraxinus americana and probably other ash trees. Not recorded south of Jefferson County, Ohio.

Carthage, May 8, 1931, (H. G. Johnston).

Neoborus rufusculus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 564, 1923.

Male. Length 4.6 mm., width 1.8 mm.; general color dark brown marked with yellow; head yellow, tylus, median line on front joining an arc on dorsal margin, dark brown to black; antennae dark brown to black, first segment darkest; pronotum dark brown, collar, irregularly on median line, spot behind outer margin of each callus and narrow basal margin, yellowish; scutellum dark brown, lateral margins, basal angles and median line, yellow; hemelytra uniformly brownish, somewhat darker on clavus, cuneus reddish brown, translucent, somewhat paler at base; legs yellow, apical half of hind femora and basal half of hind tibiae, fuscous to black; dorsum distinctly pubescent, coarsely punctate.

Female slightly larger and more robust than male. Pronotum more broadly yellow, calli only, dark brown or black; otherwise coloration and pubescence similar to male.

Breeds on Fraxinus americana. Recorded only from Minnesota, New York, and Virginia.

Wiggins, April 25, Meridian, April 28, Carthage, May 2, 1931, (H. G. Johnston).

Neoborus canadensis (Van D.).

Bul. Buffalo Soc. Nat. Sci., x, 486, 1912.

Male. Length 4.6 mm., width 1.9 mm.; general color yellowish brown; antennal segment I, clavus, apical area of corium, and subapical bands on hind femora, brown to fuscous; pronotum with calli brown, disk each side of median line, vague brownish; scutellum often with black spot at middle of base; dorsum distinctly pubescent, coarsely and rather closely punctate.

Female slightly larger, more robust, and more broadly pale than the male, the brown markings obscure or absent.

Breeds on Fraxinus americana. Recorded from Ontario, New York, Maryland, Texas, and doubtfully from California.

Carthage, May 2, 1931, (H. G. Johnston).

Neoborus osmanthicola Johnston.

Bul. Brooklyn Ent. Soc., xxx, 17, 1935.

Male. Length 4.6 mm., width 1.9 mm.; general color yellowish brown marked with dark reddish brown; antennae dark brown to black, apical half of segment II pale; pronotum nearly uniformly yellowish brown, a vague yellowish spot on median line behind calli and another behind the outer margin of each callus; scutellum yellowish brown, lateral margins

yellow and impunctate; clavus rather dark reddish brown, paler along apex of claval vein; corium reddish brown on apical third, anal ridge and extending along inner apical angle, fuscous to black; cuneus yellow, apical half red; dorsum nearly glabrous, a few rather conspicuous hairs on embolium, outer margin of corium and cuneus; legs yellow, apex of hind femora, tibiae and apex of tarsi brown.

Female slightly more robust but very similar to male in coloration.

Breeds on wild olive (Osmanthus americana). Known only from Lyman, Mississippi, the type locality.

Lyman, April 18, 1931, (H. G. Johnston).

Neoborus vittiscutis Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 566, 1923.

Male. Length 4.0 mm., width 1.9 mm.; general color dark brown to black marked with pale gray; head largely pale, median line dark brown; antennae pale; pronotum dark brown to black, dorsal portion of collar, front margin of calli, spot on median line, and usually two broad rays behind each callus, and carinate lateral margin, pale yellowish; scutellum largely pale, narrow base and sometimes extending along median line to apex black; hemelytra black, shining, clavus along claval vein, and more or less broadly along inner margin of corium, pale translucent; cuneus pale

translucent, narrowly on apex fuscous; dorsum coarsely, closely punctate, with an erect, pale hair arising from each puncture; membrane fuscous; legs uniformly pale.

Female decidedly more robust and more broadly pale; pronotum pale yellowish, a narrow black line bordering lateral carinae and a more or less obsolete fuscous line behind the outer margin of each callus; scutellum similar to male; hemelytra pale yellowish, shining, embolium, corium exterior to radial vein, black, tip of embolium pale; cuneus uniformly pale translucent; membrane largely pale, basal area surrounding areoles fuscous; punctuation and pubescence similar to male.

Breeds on Fraxinus quadrangulata. Recorded only from Virginia, Maryland, and Missouri, the type localities.

Corinth, May 25, Pontotoc, May 27, 1931, (H. G. Johnston).

Neoborus tricolor (Van D.).

Bul. Buffalo Soc. Nat. Sci., x, 487, 1912.

Female. Length 5.9 mm., width 2.8 mm.; uniformly black or dark brown; head reddish brown; antennae pale, segment II fuscous on apical fourth, III and IV, dusky; cuneus pale translucent; dorsum rather coarsely, densely punctate, with an erect, prominent, pale hair arising from each puncture; rostrum pale, apex brown; legs uniformly pale, apical half of last tarsal segment and claws fuscous.

Found on Fraxinus quadrangulata which is probably the host plant. Recorded from New Jersey, New York, Indiana, and Missouri.

Corinth, May 25, 1931, (H. G. Johnston); Wiggins May 29, 1931, (J. P. Kislanko).

Genus Xenoborus Reuter, 1908.

Elongate, subparallel species having head short, broad, nearly vertical; pronotum with lateral margins straight, ecarinate; calli prominent, subconfluent, smooth, the area between and in front of them punctate, behind the calli densely, coarsely punctate; hemelytra very long, extending beyond the abdomen for about one-fifth its length, embolar margins nearly straight, subparallel, rather densely, coarsely punctate.

Xenoborus selectus Knight.

Bul. Brooklyn Ent. Soc., xxiv, 10, 1929.

Male. Length 4.8 mm., width 2.2 mm.; general color pale yellowish with black; head dark brown to black, vertex yellow; eyes very large, vertex less than one-third the width of head; antennae black, the base of segment I pale, length of segment II greater than width of pronotum at base; pronotum yellowish brown, a triangular black spot each side of median line on basal half of disk; scutellum yellow, meso-

scutum black; hemelytra black, embolium, outer margin of corium and cuneus, yellowish translucent; legs pale yellowish, femora with two fuscous bands near apex, tibiae of middle and hind legs strongly curved; dorsum rather coarsely punctate, clothed with prominent, erect, pale pubescence.

Female. Length 5.8 mm., width 2.35 mm.; larger and much more broadly pale than male; color yellowish brown; antennae black, first segment pale at base; dorsum yellowish, clavus often dark brown; membrane and veins uniformly fuscous; tibiae of middle and hind legs scarcely curved.

Breeds on Fraxinus americana and probably other ash trees.

Recorded only from Charleston, Missouri, the type locality.

Carthage, May 2, 1931, (H. G. Johnston).

Genus Lygidea Reuter, 1875.

Elongate or oblong species with the head about as long as broad, the front subvertical; antennae rather stout, segment II linear although noticeably thickened, entirely sublinear in the male or somewhat attenuate near base in the female, almost as thick as segment I; pronotum with sides feebly sinuate, basal half of disk coarsely, rather shallowly punctate; scutellum convex, irregularly, trans-

versely striate; hemelytra nearly flat, lateral margins subparallel, cuneus but slightly deflexed, densely clothed with fine, depressed, sericeous hairs.

Lygidea obscura Reuter.

Acta Soc. Sci. Fenn., xxxvi, No. 2, 46, 1909.

Male. Length 6.0 mm., width 2.3 mm.; dark reddish brown to black marked with reddish yellow; head largely yellow, tylus and a broad band each side of median line on front, black; first antennal segment and basal third of second, black; pronotum with dorsal area of collar, median band and narrow basal margin, yellow; inner half of calli pale; scutellum with lateral margins and a narrow median line, yellow; hemelytra rather uniformly reddish brown to fuscous, somewhat paler along radial and claval veins, anal ridges distinctly pale yellowish, cuneus reddish yellow, membrane fuscous, iridescent, veins pale; sternum, lower half of venter except on genital segment, and legs except apical half of hind femora, base and apex of tibiae, and tarsi, yellow.

Female slightly more robust and more broadly pale than male; general color reddish brown darkened with fuscous; pronotum reddish brown, a rather broad band near lateral margins, and often a ray behind each callus, fuscous to black; scutellum as in male only more broadly pale; hemelytra somewhat paler at base than in male.

Found on Salix nigra which is probably the host plant.

Recorded only from New York and Ohio.

Natchez, May 15, 1931, (H. G. Johnston).

Genus Coccobaphes Uhler, 1878.

Oblong-oval, broad and rather convex species, with head broad, front subvertical, vertex convex, polished, carina nearly obsolete; antennal segment II linear, nearly as thick as segment I; pronotum distinctly punctate, calli smooth, prominent; scutellum convex, transversely striate; hemelytra with embolar margins broadly, uniformly arcuate. One species is known.

Coccobaphes sanguinareus Uhler.

Proc. Boston Soc. Nat. Hist., xix, 401, 1878.

Length 7.7 mm., width 3.5 mm.; color a nearly uniform bright red; tylus, antennal segments I and II, membrane and tibiae, reddish brown to black; antennal segments III and IV pale; apex of clavus and inner apical angle of corium sometimes dusky; dorsum finely, densely punctate, densely clothed with prominent yellow hairs.

Breeds on red maple (Acer rubrum) and sugar maple (Acer saccharum).

Corinth, May 25, Tupelo, May 26, 1931, (H. G. Johnston).

Genus Lygus Hahn, 1831.

Oblong-oval species, having the head short, its front

nearly vertical; vertex carinate and with a more or less triangular, depressed area in front of carina; front smooth, convex; rostrum usually reaching to near apex of hind coxae; antennae slender, segment II distinctly thinner at base than apex, never as thick as segment I; pronotum with disk convex, punctate except calli and the slightly elevated portion just in front of them; legs rather long, hind femora moderately incrassate; tibiae armed with spines in length equal to or greater than thickness of tibia; dorsum clothed with fine, simple pubescence.

Key to Species.

1. Length of antennal segment II exceeding width of head 2

   Length of antennal segment II less than or scarcely equaling width of head; basal carina of vertex scarcely evident; oval, robust, yellowish brown to dark reddish brown and darkened with fuscous . . . . . rubicundus

2. Length of antennal segment II exceeding width of pronotum at base, or if not, then the head not particularly broad and length of specimen greater than 4.5 mm. 3

   Length of antennal segment II scarcely equal to width of pronotum at base, head unusually broad for size

of insect, equal to more than half the width of pronotum at base; eyes large; length 4-4.5 mm. , ... fasciatus var. olivaceous

3. Pronotum coarsely or at least distinctly punctate; body integuments heavily chitinized; right genital clasper of male with claw at tip curving ventrad or caudad, in length less than greatest width of clasper; left clasper without prong at middle (at posterior extremity of lateral aspect) 4

Pronotum very finely punctate; body integuments more thinly chitinized, bodies more fragile; right genital clasper of male with an apical hook or prong projecting mesad, its length as great or greater than thickest part of clasper; left clasper with a prong at middle . . . (subgenus Neolygus) 5

4. Color yellowish brown to reddish brown or blackish; tibiae annulated with darker near base . . . . . pratensis var. oblineatus

Color chiefly green; tibiae pale greenish, without annuli at base; eyes rather large . . . . . apicalis

5. Pronotal disk blackish or marked with dark rays or spots 12

Pronotal disk greenish or yellowish to brownish but without dark spots or rays 6

6. Color chiefly greenish, old specimens frequently fading to yellowish green; sometimes darkened on clavus and tip of corium, but ground color green . 7

Color distinctly yellowish or brownish, more brownish than green 9

7. Dorsum uniformly greenish to greenish yellow, a small fuscous mark formed at inner apical angle of corium 8

Dorsum with brownish; apical area of corium and clavus next to scutellum distinctly brownish or sometimes fuscous . . . . . inconspicuus

8. Membrane uniformly pale; length 4.6-5 mm. . . . . tiliae var. heterophyllus

Membrane distinctly clouded with fuscous at base; length 5.2-5.6 mm. . . . . neglectus

9. Rostrum scarcely attaining apices of intermediate coxae; color a rich yellowish brown, darker on clavus and transversely on apex of corium; body rather robust . . . . . nyssae

Rostrum extending beyond apices of intermediate coxae, hind femora not distinctly bianulate before apices 10

10. Scutellum somewhat infuscated, a pale median vittae on apical half; dorsum usually dark greenish brown

to blackish; femora dark greenish brown but pale at extreme tips . . . . . invitis

Scutellum sometimes dark but with no indication of a pale line on apical half 11

11. Hemelytra and apical half of femora uniformly fulvo-aeneous, not appreciably darker on clavus and apex of corium . . . . . fagi

Hemelytra not uniformly colored, clavus and apical half of corium darker than scutellum and basal half of corium . . . . . geneseensis

12. Pronotal disk with distinct spots or rays behind calli 13

Pronotal disk without distinct spots or rays; hind femora blackish, annulated with pale near apices; hemelytra blackish, costal margin scarcely paler, cuneus clear, apex fuscous . . . . . caryae

13. Hind femora dark brownish to black on apical half but not distinctly biannulate, distinctly pale on apices only; venter fuscous brown, a lateral pale stripe dividing the darker color . . . . . semivittatus

Hind femora biannulated near apices with brownish black or pale 14

14. Scutellum except median line apically, and hemelytra except cuneus, dark fuscous to blackish . . . caryae

Scutellum and basal half of corium and embolium dis-

tinctly paler, not distinctly fuscous or blackish . . . . . caryae var. subfuscous

Lygus pratensis oblineatus (Say).

Complete Writings, i, 340, 1859.

Length 5.0-5.5 mm., width 2.5 mm.; ovate, shining, general color yellowish brown, more or less broadly marked with black, or reddish brown marked with fuscous; head yellowish brown, usually with three reddish or fuscous stripes on front; antennae dark brown, middle of segment II often yellow; pronotum yellowish, usually with two lateral stripes and four shorter ones on the disk, black, these often reduced to black spots; scutellum blackish, with a Y-shaped or heart-shaped yellowish area on the disk but sometimes largely yellowish; hemelytra yellowish or reddish brown, irregularly marked with fuscous, darkest on apex of corium, veins distinctly paler; dorsum sparsely clothed with short, recumbent hairs; male genital claspers distinctive.

This species, the "tarnished plant-bug", is widely distributed throughout the United States and is one of the most abundant species in the eastern states, breeding on many different plants, and is often a pest on cultivated crops.

Common throughout the state from March until November.

Lygus fasciatus olivaceous Reuter.

Ofv. Finska Vetensk. Soc. Forh., xlix, No. 5, 6, 1907.

Male. Length 4.0 mm., width 1.8 mm.; greenish yellow marked with reddish and brown; eyes rather large, head unusually broad for the size of the insect, width across eyes .98 mm.; pronotum uniformly yellowish green or olive green, minutely, densely punctured, covered with fine, pale yellowish pubescence; scutellum dark reddish to fuscous, the apex more or less pale; hemelytra greenish yellow, inner half of clavus, and inner apical angles of corium reddish to fuscous, cuneus pale yellowish, apex reddish to black; membrane pale to fuscous; legs greenish yellow, apex of hind femora with two reddish or fuscous bands near apices; genital claspers distinctive of the species.

Female slightly larger and more robust than male but quite similar in coloration.

Breeds on Cephalanthus occidentalis and Myrica cerifera.

Biloxi, June 14, Bay Saint Louis, June 15, 1917, (H. H. Knight).

Lygus rubicundis (Fallen).

Hemip. Suec., p. 92, 1829.

Male. Length 4.5 mm., width 2.1 mm.; color a nearly uniform dark, reddish brown, the head and anterior median portion of pronotum paler; antennal segment II short, not equal to width of head; pronotum finely, densely, punctate, the narrow posterior margin yellowish or ivory white; scu-

tellum dark reddish brown, the narrow median line paler; dorsum densely clothed with recumbent, silvery pubescence; genital claspers distinctive of the species.

Female very similar to male but usually much paler in color.

Breeds on Salix nigra and probably most other species of willow. This species is widely distributed throughout the United States and is easily recognized because of the short second antennal segment.

Long Beach, April 18, Columbia, May 12, Natchez, May 15, Wiggins, May 29, A. & M. College, May 30, 1931; Anguilla, July 5, 1929, (H. G. Johnston).

Lygus apicalis Fieber.

Eur. Hemip., p. 275, 1861.

Male. Length 4.5-5.0 mm., width 2.0 mm.; color a nearly uniform yellowish green or dark green, the membrane and sometimes the inner apical angle of corium fuscous; head broad, eyes quite large for the size of insect, vertex narrow, carina thick, arcuate; pronotum finely, shallowly punctate, densely clothed with fine, yellowish pubescence; scutellum and hemelytra densely clothed with yellowish, sericeous pubescence; membrane fuscous, veins pale; legs greenish, hind femora with two indistinct fuscous bands near apices; genital claspers distinctive, left clasper very complicated.

Female very similar to male in coloration and pubescence.

Breeds on Erigeron canadensis.

Carthage, June 8, Yazoo City, July 27, Natchez, July 31, Brookhaven, August 3, Tylertown, August 5, New Augusta, August 12, Newton, August 15, Union, August 16, 1929; Meridian, April 28, Wiggins, May 29, 1931, (H. G. Johnston).

Lygus fagi Knight.

Cornell Univ. Agr. Expt. Sta., Bul. 391, 603, 1917.

Male. Length 4.8 mm., width 1.9 mm.; color uniform rich yellowish brown; head scarcely more yellowish, eyes dark brown; rostrum reaching apex of hind coxae; pronotum finely, shallowly punctate; hemelytra scarcely paler on embolar margins, membrane darkened with fuscous, the veins brown; dorsum densely clothed with suberect, yellowish hairs; venter, sternum and legs uniformly yellowish brown, apices of tarsi fuscous; genital claspers distinctive of the species.

Female slightly larger and more robust but quite similar to male in color and pubescence.

Breeds on beech (Fagus grandifolia), but only in cool, shady situations. Mississippi specimens were collected on holly (Ilex opaca) which was in bloom at that time. No nymphs were taken so they might have been attracted only to the blossoms. Not recorded south of New York and Indiana.

Wiggins, May 5, 1931, (H. G. Johnston).

Lygus invitus (Say).

Complete Writings, i, 345, 1859.

Male. Length 5.0 mm., width 2.0 mm.; yellowish green to brown or fuscous; head yellowish green to brown, basal carina distinct, smooth, shining, finely pubescent; antennal segment I dark greenish, III brown to fuscous, III and IV fuscous; pronotum yellowish green to dark green with fuscous, lateral margins of disk paler, frequently bright green between and in front of calli, disk finely, shallowly punctate; scutellum dark brownish to fuscous, apical half of median line pale, in some cases this pale vitta extending the full length of scutellum; hemelytra rather uniformly brownish to fuscous, basal angle of corium and basal half of embolium paler, cuneus pale translucent, sometimes greenish, membrane fuscous; legs pale or greenish, apical half of hind femora and apex of tarsi fuscous; venter pale beneath, sides fuscous, genital segment fuscous, shining; genital claspers distinctive.

Female slightly larger and paler in color than the male, the pale vitta on scutellum more extended.

Breeds on elm (Ulmus americana). Not recorded in the east south of Connecticut and Indiana.

Winona, May 21, 1931, (H. G. Johnston).

Lygus geneseensis Knight.

Cornell Univ. Agr. Expt. Sta., Bul. 391, 609, 1917.

Male. Length 5.0 mm., width 2.05 mm.; general color yellowish brown to dark brown or fuscous; head yellowish brown, tip of tylus darker; antennae yellowish, segments III and IV, fuscous; rostrum reaching apices of hind coxae; pronotum dark brown to fuscous, finely, shallowly punctate; hemelytra yellowish translucent, clavus and inner apical half of corium brown to fuscous, cuneus pale translucent, membrane fuscous, darker within the areoles; legs yellowish, hind femora darker on apical half but not annulated near apices; venter uniformly dark brown, genital segment shining; genital claspers distinctive.

Female quite similar to male but nearly a uniform yellowish brown color.

Breeds on post oak (Quercus stellata).

Crawford, April 29, Carthage, May 2, Wiggins, May 5, Corinth, May 25, 1931, (H. G. Johnston).

Lygus inconspicuus Knight.

Cornell Univ. Agr. Expt. Sta., Bul. 391, 612, 1917.

Male. Length 4.5 mm., width 2.1 mm.; pale greenish fading to yellowish brown with a transverse spot of dark brown across apex of corium and brown on clavus bordering scutellum; head short, nearly vertical, carina distinct, an

impressed line curving from dorsal margin of each eye onto vertex; antennae yellowish green, segments III and IV fuscous; pronotum yellowish to greenish fading to yellowish brown, minutely and shallowly punctate; scutellum pale yellowish, minutely rugose; hemelytra greenish fading to yellowish brown, clavus dark brown bordering scutellum, apex of corium dark brown to fuscous; legs green fading to yellow; clothed with fine yellow pubescence; genital claspers distinctive.

Female very similar to male in size and coloration.

Breeds on wild grape (Vitis sp.). Not previously recorded from Mississippi.

Columbia, May 12, Natchez, May 15, Tchula, May 18, Oxford, May 22, 1931, (H. G. Johnston).

Lygus tiliae heterophyllus Knight.

Bul. Brooklyn Ent. Soc., xiii, 44, 1918.

The original description is quoted here.

"Structurally not differing from tiliae but uniformly green in color, membrane pale; males with the inner apical angles of the corium lightly infuscated, but never as dark as the typical female of tiliae; females uniformly delicate pale green, might easily be confused with small pale forms of apicalis but distinguished by having a shorter rostrum.

"Described from specimens taken on Tilia heterophylla, where the species was found breeding."

A. & M. College, April 3, (G. F. Arnold).

Lygus caryae Knight.

Cornell Univ. Agr. Expt. Sta., Bul. 391, 615, 1917.

Male. Length 4.8-5.7 mm., width 2.1 mm.; color dark brown to black; head brownish black to nearly black; vertex with an impressed triangle just before the carina, the apex extending as an impressed longitudinal line on front; antennae dark brown to fuscous, the first segment greenish yellow; pronotum black, sometimes inner margins of calli and rather broadly on median line, brown, disk especially on basal half transversely rugulose; scutellum black sometimes brownish on apex; hemelytra black, sometimes brownish black, often the base of embolium and corium yellowish, cuneus clear with apex and basal margin sometimes fuscous; legs greenish yellow, apical half of hind femora fuscous, apex of middle femora with two fuscous bands; venter black or brownish black with small yellowish spots surrounding spiracles; genital claspers distinctive; dorsum clothed with yellowish pubescence having a wax-like appearance.

Female slightly larger, more robust and frequently more broadly pale than male.

Breeds on species of hickory (Carya) including pecan (Carya illinoensis).

A. & M. College, May 20, (L. O. Smith); Wiggins, April

25, Meridian, April 28, Crawford, April 29, Columbia, May 12, 1931, (H. G. Johnston).

Lygus caryae subfuscous Knight.

Cornell Univ. Agr. Expt. Sta., Bul. 391, 616, 1917.

Structurally not differing from caryae but the color very different; general color yellowish brown to fuscous; head yellowish, second antennal segment yellowish brown, apical half fuscous; pronotum yellowish brown with two black spots, one behind each eye and frequently extending backward over the calli forming two black rays; scutellum pale yellowish, frequently fuscous at base and in dark specimens extends as a fuscous median line toward apex; hemelytra yellowish brown, clavus dark brown to fuscous bordering scutellum, corium more or less dark brown to fuscous on inner margin and apex, cuneus yellowish translucent; legs yellowish, hind femora and sometimes front and middle femora with two narrow, fuscous bands near apex on ventral side.

Breeds on Carya spp. with the typical variety.

Ocean Springs, April 4, (R. W. Harned); Pascagoula, April 30, (L. Brown); Wiggins, April 26, Meridian, April 28, Columbia, May 12, Tylertown, May 12, Natchez, May 15, Water Valley, May 22, A. & M. College, May 29, 1931, (H. G. Johnston).

Lygus neglectus Knight.

Cornell Univ. Agr. Expt. Sta., Bul. 391, 619, 1917.

Male. Length 5.2 mm., width 2.3 mm.; color a nearly uniform bright green fading to yellowish green in old specimens; head yellow, smooth, shining; antennae green; pronotum uniformly green to yellowish green, finely, shallowly punctate; hemelytra nearly uniform greenish yellow with membrane yellowish brown, and inner angles of corium and cuneus, fuscous; dorsum clothed with very fine yellowish pubescence; legs yellowish green, tibiae more distinctly green; genital claspers distinctive.

Female slightly larger than the male but very similar in coloration and pubescence.

Breeds on ironwood (Carpinus caroliniana).

Wiggins, May 5, Poplarville, May 11, 1931, (H. G. Johnston).

Lygus semivittatus Knight.

Cornell Univ. Agr. Expt. Sta., Bul. 391, 626, 1917.

Male. Length 5.3 mm., width 2.2 mm.; color yellowish brown marked with dark brown or fuscous; head yellowish brown, apical half of tylus black; antennae yellowish, apical one-third of segment II, and segments III and IV, darkened with fuscous; pronotum yellowish brown, a small fuscous spot behind each callus scarcely forming a ray; scutellum yellowish brown, dark brown or fuscous at the sides; hemelytra dark brown to fuscous, embolium, basal half of corium out-

side radial vein, clavus outside claval vein, and cuneus, pale yellowish; densely clothed with pale yellowish pubescence; legs yellowish green, posterior femora brownish to dark brown, indistinctly annulated near apices; venter dark brown to fuscous, pale beneath except on genital segment, a pale longitudinal stripe on the sides and a pale spot surrounding each spiracle; genital segment with a yellow spot at base of each clasper; genital claspers distinctive.

Female very similar to male but with less fuscous on the hemelytra.

Collected only on Nyssa sylvatica which is probably the host. This species was described from New York and Virginia. Since recorded from Alabama and Texas.

Lyman, April 18, Wiggins, April 25 and May 5, Meridian, April 28, Mississippi City, April 11, Carthage, May 2, 1931, (H. G. Johnston).

Lygus nyssae Knight.

Bul. Brooklyn Ent. Soc., xiii, 43, 1918.

Male. Length 5.5 mm., width 2.5 mm.; color rich yellowish brown marked with darker brown or fuscous; head yellowish brown, strongly shining, subvertical, carina distinctly arcuate; antennae yellowish, segments III and IV tinged with fuscous; pronotum and scutellum uniformly rich yellowish

brown; hemelytra rich dark brown, clavus slightly darker, embolium, narrow adjacent margin of corium and cuneus pale yellowish; membrane uniformly fuscous, veins brownish; densely clothed with fine yellowish pubescence; legs pale to yellowish, the apices of femora scarcely darker; venter yellowish, slightly darker on the sides and tip of genital segment; genital claspers distinctive.

Female very similar to male in size and coloration.

Breeds on Nyssa sylvatica. Described from Alabama and since recorded from Connecticut and Ohio.

Wiggins, May 15, Poplarville, May 11, Grenada, May 20, Corinth, May 25, 1931, (H. G. Johnston).

Genus Dichrooscytus Fieber, 1858.

Oblong-oval species having the head short, strongly declivent, eyes prominent, width of head through eyes equal to twice its length, carina distinct; antennae slender, first segment not surpassing the tip of the tylus; pronotum short, broad, strongly convex, collar and calli distinct, disk finely rugose and minutely punctate; mesoscutum concealed, scutellum strongly convex; hemelytra with embolar margins broadly curved, cuneus and membrane strongly deflexed.

Key to Species.

Dorsum bright green; pubescence on pronotum blackish; membrane fuscous . . . . . viridicans

Dorsum greenish-yellow tinged with reddish; pubescence on pronotum brown; membrane dusky . . . . . tinctipennis

Dichrooscytus tinctipennis Knight.

Proc. Biol. Soc. Wash., xl, 15, 1927.

Length 3.5 mm., width 1.5 mm.; general color greenish yellow tinged with reddish on hemelytra; antennae uniformly yellowish green; dorsum clothed with rather short, stiff, brownish, pubescence; ventral surface bright green, legs yellowish. Sexes quite similar in color and pubescence.

Breeds on red cedar (Juniperus virginiana).

This species was recorded by Knight (Hemiptera of Conn., 597, 1923) and by Blatchley (Heteroptera Eastern North America, 742, 1926) as D. elegans Uhler.

Tchula, May 18, Corinth, May 25, A. & M. College, May 29, 1929, (H. G. Johnston).

Dichrooscytus viridicans Knight.

Bul. Brooklyn Ent. Soc., xiii, 114, 1918.

Length 3.2 mm., width 1.2 mm.; very similar to tinctipennis in structure, but color bright green and pubescence on pronotum black and more conspicuous; head, coxae and

femora sometimes pale to brownish; pronotum and scutellum sometimes yellowish green; margins on the apical half of cuneus reddish; membrane fuscous, veins reddish. Female slightly more robust but similar to male in coloration and pubescence.

Breeds on red cedar (Juniperus virginiana). Not recorded south of Ohio.

Starkville, June 13, Columbus, June 20, Vicksburg, July 29, 1929, (H. G. Johnston).

Genus Polymerus Hahn, 1831.

Elongate-oval, pubescent species having the head strongly declivent; antennae inserted above base of tylus, pronotum short, broad, strongly convex, somewhat rugose; calli feebly evident; hemelytra entire, cuneus and membrane strongly deflexed; body above and below densely clothed with silky, sericeous or tomentose pubescence.

Key to Species.

Rostrum surpassing apex of hind coxae; yellowish brown and darkened with fuscous; cuneus usually red . . basalis

Rostrum scarcely reaching apex of hind coxae; mostly black and marked with pale yellowish; cuneus black . . cuneatus

Polymerus basalis (Reuter).

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 73, 1876.

Length 3.5-4.8 mm., width 1.5-2.3 mm.; general color pale to yellowish and more or less darkened with fuscous to black; head yellowish, vertex obliquely striate with parallel fuscous lines each side of middle; disk of pronotum with lateral margins, small rounded spot on each callus, and an indistinct ray behind each callus, fuscous to black; scutellum fuscous to black, apex more or less white; hemelytra yellowish, clavus and apical half of corium chiefly fuscous; apical half of embolium and cuneus usually reddish; legs often tinged with red, hind femora with two subapical fuscous bands; clothed with silvery, sericeous pubescence. Sexes similar in coloration and pubescence.

Breeds abundantly on dog fennel (Anthemis spp.), pig weed (Amaranthus spp.) and others.

This species is widely distributed throughout the eastern United States and is extremely variable in size and color. It often occurs in enormous numbers and is sometimes a pest on cultivated crops. There are several generations during the season.

Polymerus cuneatus (Dist.).

Biol. Centr. Americana, Heteroptera, i, 435, 1893.

Length 3.6 mm., width 1.5 mm.; general color black marked with yellow; head black, vertex with rounded yellow spot near inner margin of each eye; pronotum sometimes with faint yellow markings on lateral margins and around calli; outer half of clavus and basal fourth of corium more or less yellowish; legs usually yellowish with two rows of vague fuscous dots on outer surface of hind femora, often dark brown, tibiae and tarsi yellow, claws fuscous. Sexes similar.

Host plant unknown. Described from Central America and Mexico. Recorded from Florida and Texas.

Starkville, June 13, 1929, (H. G. Johnston).

Genus Neocapsus Distant, 1884.

Oblong-oval nearly glabrous, shining species having head short, subvertical; pronotum short, broad, coarsely punctate; antennae slender with long slender pubescence; tibiae strongly spinose; pronotum and hemelytra with minute, scale-like pubescence in punctures.

Neocapsus cuneatus Distant.

Biol. Centra Americana, Heteroptera, i, 438, 1893.

Male. Length 6.0 mm., width 2.7 mm.; general color shining black; head, pronotum and scutellum more or less red or yellow marked with black; head sometimes chiefly black

with only the vertex red or yellow; pronotum with calli and spot within each humeral angle black, these areas sometimes extended so that only the collar, disk and narrow posterior margins are red or yellow; scutellum distinctly transversely striate; mesoscutum and scutellum red or yellow, the mesoscutum sometimes with three black spots, the middle one extending upon the base of scutellum; antennae dark brown to black, segment I the darkest; legs varying in color from an almost uniform red or yellow to almost black; pubescence minute, inconspicuous.

Female. Length 5.7 mm., width 2.9 mm.; color more variable than in male; shining black marked with red or yellow, the red or yellow markings much more extensive than in the male, often more red than black; head, pronotum and scutellum uniformly red or yellow, sometimes a black spot on anterior angles and within the humeral angles of pronotum; hemelytra shining black with cuneus uniformly red or yellow, the basal third of corium more or less and often the embolium yellowish; antennae chiefly brown, sometimes segments I and II largely yellowish; ventral surface of thorax chiefly yellowish marked with brown; legs yellowish sometimes with fuscous; ventral abdominal segments fuscous to black.

Breeds on post oak (Quercus stellata).

This species was described from Mexico and has since

been recorded only from Texas and Arizona. The Texas and Mississippi specimens are more broadly red or yellow than the Mexican specimens described by Distant. In the large series studied none have the scutellum black, though sometimes a small black spot extends from mesoscutum upon the base of scutellum. Dr. Knight (Ent. News, 36, 78, 1925) states that specimens from Arizona have the scutellum partly yellow. This species seems to be rather uncommon in Mississippi although I have found it very abundant at College Station, Texas.

A. & M. College, April 18, 1923, (S. B. Murray); A. & M. College, April 16, 1925, (W. R. Meador); Crawford, April 29, 1931, (H. G. Johnston).

Neocapsus cuneatus leviscutatus Knight.

Ent. News, xxxvi, 79, 1925.

This variety is very similar to cuneatus Distant and differs from Texas and Mississippi specimens of this species only by having the scutellum entirely smooth, not transversely striate.

A. & M. College, May 7, 1915, (G. F. Arnold), type specimen. Recorded elsewhere only from Linville Falls, North Carolina.

Genus Horcias Distant, 1884.

Oblong-oval, subglabrous, shining species, having the

head short, broad, its front strongly declivent; eyes prominent; pronotum broadly convex, impunctate, collar rather prominent, calli distinct; antennae slender, segment II distinctly thickened, usually widest at apex, III and IV, much more slender; hemelytra entire, cuneus and membrane strongly deflexed.

Horcias dislocatus (Say).

Complete Writings, i, 339, 1859.

Length 6.2 mm., width 3.0 mm.; general color orange-red to bright red; antennal segments I and II, tylus, juga, base of vertex, two wedge-shaped approximate rays on basal half of pronotum, scutellum except usually the median line, inner half or more of clavus, inner apical angles or more of corium, membrane, pleura, and often sternum, coxae except first pair, and venter, dark brown to black. Sexes similar.

Breeds on Nothoscordum bivalve. Not recorded south of New Jersey. Fourteen color varieties have been described from the United States indicating the exceedingly variable coloration of the species.

Holly Springs, May 23, 1931, (H. G. Johnston).

Horcias dislocatus gradus Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 609, 1923.

Similar to dislocatus (Say) but the pronotum is uniformly red, the scutellum uniformly black, and the femora and

front coxae black.

Breeds on Nothoscordum bivalve. I have previously (Bul. Brooklyn Ent. Soc., 24, No. 4, 217, 1929) recorded this variety from College Station, Texas, the only record from south of New Jersey.

Corinth, May 25, 1931, (H. G. Johnston);

Genus Adelphocoris Reuter, 1896.

Elongate, subparallel, pubescent species having the head porrect, its front strongly declivent, vertex with a short, median, impressed line; eyes prominent, well removed from pronotal angles; pronotum broadly convex with shallow, rugulose punctures, calli distinct; thickness of antennal segment IV equal to or greater than the thickness of segment II at the base.

Adelphocoris rapidus (Say).

Complete Writings, i, 339, 1859.

Length 7.0 mm., width 2.8 mm.; general color dark brown marked with yellow; head reddish-brown; antennae dark brown, basal half of segments II and III yellow; pronotum yellow, calli reddish brown, and two large, circular spots on basal half, dark brown; hemelytra dark brown with embolium and lateral margin of cuneus yellow, rather densely clothed with yellowish pubescence. Sexes similar in size and coloration.

Breeds on Rumex and many other plants. Widely distributed throughout the United States east of the Rocky Mountains and very common in the Eastern and Southern portions. A rather abundant pest on cotton in the South.

Genus Creontiades Distant, 1883.

Elongate, subparallel, finely pubescent species having the head porrect, its front strongly declivent, vertex with conspicuous median impressed line, front distinctly, obliquely striated each side of median line; antennae slender, pubescence inconspicuous, a few short, setose hairs on first segment; disk of pronotum only slightly convex, rugulose, scutellum rather strongly convex; hind femora reaching to near tip of abdomen; tibiae with many long, prominent spines.

Creontiades debilis Van Duzee.

Pomona Jl. Ent. Zool., vii, 111, 1915.

Length 6.1 mm., width 2.1 mm.; general color a nearly uniform pale greenish yellow, apex of scutellum, rostrum and tarsal claws fuscous; hemelytra pale translucent, embolar margins nearly straight, parallel; membrane fumate, veins green. Sexes very similar.

Breeds on Daubentonia longifolia. Recorded from Florida, Georgia, Mississippi, and Texas. It is a rather serious pest of cotton in some sections of Texas.

Biloxi, June 14, 1917, (H. H. Knight).

Genus Paracalocoris Distant, 1883.

Elongate-oval impunctate species having the head porrect, its front slightly declivent; eyes large, prominent; pronotum strongly narrowed in front, the width at base about three times as great as the width at anterior margin; side margins straight, not carinate; disk of pronotum strongly declivent toward apex and with two excavated, velvety brown or black spots; antennae slender, segment I densely clothed with long, suberect, bristly hairs; left clasper of male with large rounded or pointed lobe on dorsal side at base.

Key to Species.

1. Hind tibiae thickly clothed with long erect hairs which obscure or become confused with the tibial spines 2

   Hind tibiae with hairs shorter and more appressed, especially on the inner side, hairs not easily confused with true spines 3

2. Hemelytra with costal margin black like the corium . . . . . (typical) scrupeus

   Hemelytra with costal margin red or yellow . . . . . scrupeus var. bidens

3. Antennal segment I distinctly longer than pronotum; general coloration black with red; pubescence uniformly silvery white . . . . . johnstoni

Antennal segment I not equal to length of pronotum . 4

4. Pronotum and scutellum dark brownish black, distinctly trivittate with pale; antennal segment I dark brown with few if any pale spots . . . . . trivittis

Pronotum and scutellum not distinctly trivittate with pale; antennal segment I distinctly marked with pale 5

5. Antennal segment II rather uniformly yellowish brown, in darkest specimens with blackish only on the apex; scutellum with pale color irregular, not forming a distinct pale line . . . . . salicis

Antennal segment II with pale annulus next to the black base and another at middle; scutellum with a distinct, narrow, pale, median line . . . . colon

Paracalocoris scrupeus (Say).

Compl. Writings, i, 342, 1859.

Length 6.5 mm.; width 2.5 mm.; general color fuscous to black with pronotum behind calli, excepting black velvety spots, and scutellum orange-red or yellow; hind tibiae densely clothed with long erect hairs which obscure the tibial spines.

This species with its eighteen color varieties is easily

separated from all other nearctic forms by the dense covering of long erect hairs on the hind tibiae. These hairs extend outward in every direction and more or less completely conceal the tibial spines.

Breeds principally on wild grape (Vitis spp.), but also occurs on cultivated varieties.

Wiggins, May 5, Oxford, May 22, Tupelo, May 26, 1931, (H. G. Johnston).

Paracalocoris scrupeus bidens McAtee.

Ann. Ent. Soc. Amer., ix, 374, 1916.

This variety is readily distinguished from scrupeus (Say) by having the embolar margins and cuneus orange-red to yellow.

Wiggins, May 5, 1931, (H. G. Johnston).

Paracalocoris salicis Knight.

Ann. Ent. Soc. Amer., xix, 367, 1926.

Length 6.2 mm., width 2.5 mm.; general color pale yellowish but more or less clouded with dark brown; length of antennal segment I greater than width of head, segment II uniformly yellowish brown, sometimes in darkest specimens narrowly black on apex; pronotal disk brown with scattered pale spots, a pale irregular median line extending to posterior margin and continuing on the scutellum; hemelytra brown to dark brown and marked with pale, irregular spots; cuneus

yellowish white, inner basal angle, apex, and along inner margin, brown; in darker specimens the hemelytra are nearly uniformly brown with the cuneus reddish; membrane pale to brownish, veins white, usually brown around smaller areole; legs yellowish to brown, femora marked with numerous pale spots, tibiae darker on basal third with a pale band at middle and a narrow one at apex; dorsum clothed with short yellowish pubescence, more golden on the clavus. Sexes very similar in coloration and pubescence.

Breeds on Salix longifolia. Recorded only from Minnesota, South Dakota, Nebraska, Iowa, and Colorado.

Booneville, May 26, A. & M. College, May 29, 1931, (H. G. Johnston).

Paracalocoris johnstoni Knight.

Ann. Ent. Soc. Amer., xxiii, 815, 1930.

Length 7.0 mm., width 2.9 mm.; general coloration black with red; antennal segment I distinctly longer than pronotum; head red, tylus blackish, front somewhat infuscated; pronotum red, posterior half, except median line and slender basal margin, black, discal spots rather large, velvety black; scutellum red, sometimes dark red to black; hemelytra black, embolium and cuneus red, the corium exterior to radial vein usually red; legs uniformly black but with a reddish tinge, hind tibiae with spines prominent, pubescent hairs short,

recumbent; dorsum densely clothed with recumbent, in part sericeous, silvery white pubescence. Female slightly more robust but very similar to male in coloration and pubescence.

Breeds on Smilax rotundifolia. Recorded only from College Station, Texas, the type locality.

Wiggins, May 5, Water Valley, May 12, Grenada, May 20, Corinth, May 25, 1931, (H. G. Johnston).

Paracalocoris colon (Say).

Complete Writings, i, 346, 1859.

Length 5.8 mm., width 2.5 mm.; general color pale yellowish to gray or dark brown, spotted with yellow; length of pronotum 1.33 mm.; antennal segment I, length 1.1 mm., brownish spotted with yellow, clothed with black suberect hairs, in length scarcely equal to thickness of segment; II, 2.2 mm., narrow base and apical third black, brownish between, but with pale annuli bordering the black; III, .97 mm.; IV, 1.08 mm., segments III and IV pale to fuscous becoming darker toward apex; dorsum clothed with pale yellowish to golden pubescence; legs yellowish, apical third of femora and two bands on tibiae brownish. Sexes quite similar in coloration and pubescence.

This species has been so often confused with others that records of host plants and distribution are doubtful.

A. & M. College, May 29, 1931, (light trap), (H. G. Johnston).

Paracalocoris trivittis Knight.

Ann. Amer. Ent. Soc., xix, 371, 1926, trivittatus.

Ann. Amer. Ent. Soc., xxiii, 812, 1930. (New name for trivittatus Knight).

Male. Length 5.8 mm., width 2.3 mm.; general color dark brownish black with the pronotum and scutellum trivittate with pale; head yellowish brown the juga uniformly dark brown; antennae dark brownish black, length of segment I greater than width of head, segment II, pale at middle and next to the dark base with light brown between the pale bands, III, pale, the apical third brown; pronotum dark brownish black, median line of disk and another line each side beginning at outer margin of discal spots pale, also a short pale spot against the inner margin of discal spots; scutellum brownish black with distinct pale median line appearing as an extension of median line on pronotum, also each side with a pale vitta from near basal angle that extends parallel to lateral margin; hemelytra dark brownish black, clothed with brown and silvery pubescence intermixed, bordering outside of radial vein and extending beyond middle of corium, also a mark at base of corium, the slender outer edge of embolium and cuneus, and irregular spots, pale; legs dark brownish black with one large and numerous small pale spots, tibiae with pale bands broader than dark bands, hind tibiae with pubescence short and spines prominent. Female unknown.

This species known from one male specimen.

Columbus, July 24, 1921, (C. J. Drake).

Genus Garganus Stal, 1862.

Elongate, subparallel species having the head porrect, its front subvertical; eyes prominent; rostrum surpassing hind coxae; antennae with segment I filiform, longer than pronotum, segment II robust, fusiform, densely clothed with stiff, recumbent, black hairs, III and IV, slender; collar very narrow; calli obsolete; hemelytra with embolar margins parallel.

Garganus fusiformis (Say).

Complete Writings, i, 344, 1859.

Length 3.9 mm., width 1.5 mm.; general color fuscous to black; antennal segment I, reddish brown, clothed with closely appressed, short, black hairs, II, black, fusiform, clothed with prominent, recumbent, black hairs; III, black, pale on basal half, IV, black; collar, embolium, outer margin of cuneus, median line of scutellum, narrowly along the commissure, legs, and sometimes the venter reddish yellow. Sexes quite similar in coloration and pubescence.

Breeds on Tussilago farfara and other herbaceous plants in cool, damp environments. Widely distributed in Eastern United States.

Charleston, September 15, 1928, (H. M. Harris).

Genus Neurocolpus Reuter, 1876.

Rather robust, oval species having the head porrect, somewhat exserted; eyes prominent; rostrum reaching upon hind coxae, segment I reaching front coxae; antennal segment I thickened and clothed with numerous flattened hairs; pronotum subcampanulate, about as wide at base as long, side margins sinuate at middle, not carinate; femora with apical halves densely pubescent.

Key to Species.

Antennal segment I not or scarcely equal to one-half the length of segment II; hind femora pale, apices black . . . . . jessiae

Antennal segment I equal to two-thirds the length of segment II; rostrum not surpassing apices of hind coxae . . . . . nubilus

Neurocolpus nubilus (Say).

Complete Writings, i, 341, 1859.

Length 6.0 mm., width 2.0 mm.; general color yellowish brown to reddish brown or black, usually marked with numerous pale, yellow spots; head, pronotum and scutellum usually paler with yellow spots more numerous; pronotum and hemelytra

clothed with slightly sericeous, recumbent, golden pubescense, intermixed with suberect, simple, golden to brown hairs, pronotum with tufts of dark brown hairs on posterior half; legs chiefly yellowish to dark brown with numerous yellow spots on hind femora, hind tibiae usually with two, broad, pale bands. Female very similar to male in coloration and pubescence.

Breeds on button bush (Cephalanthus occidentalis) and Rhus spp.

This species is exceedingly variable in color and has been confused with several species recently described (Bul. Brooklyn Ent. Soc., 29, No. 4, 162-167, 1934) by Dr. Knight so that its general distribution cannot be accurately given.

Carthage, May 2, Tchula, May 18, Tupelo, May 26, 1931; Carthage, June 8, Louisville, June 13, Anguilla, July 3, Yazoo City, July 27, Columbia, August 6, Laurel, August 14, 1929, (H. G. Johnston).

Neurocolpus jessiae Knight.

Bul. Brooklyn Ent. Soc., xxix, No. 4, 163, 1934.

Male. Length 6.3 mm., width 2.3 mm.; general color of the dorsum chiefly dark brown to black, head, more or less broadly on anterior half of pronotum, spots on embolium and scutellum, and basal half of cuneus, pale to yellowish; body

beneath pale to yellowish, sides of thorax and venter more or less infuscated; legs pale, apical fourth of hind femora black, front and middle femora fuscous apically; tibiae pale, hind tibiae with basal fourth and broad band beyond middle, black; pronotum and hemelytra clothed with slightly sericeous, golden, recumbent pubescence, and intermixed with simple, suberect, yellow to dark brown hairs; coarse and bristle-like on posterior half of pronotum. Sexes very similar in color and pubescence.

Found breeding on an herbaceous Umbelliferae. Known from Ontario to Texas and west to Wisconsin and Missouri.

Carthage, June 8, Starkville, June 13, 1929, (H. G. Johnston).

Genus Phytocoris Fallen, 1814.

Elongate, subparallel, slender species having the head short, porrect, as broad or broader than long, its front declivent; eyes prominent, longer than wide; vertex not carinate at base; rostrum reaching or surpassing middle coxae, joints I and II of equal length; antennae slender, almost filiform, as long or longer than the body; pronotum short, collar and calli distinct; mesoscutum narrowly exposed; hemelytra long, the embolar margins subparallel, cuneus long, triangular; legs long and slender, hind femora surpassing apex of abdomen.

This is probably the largest genus in the family Miridae. At the present time there are 144 species known to occur in the United States and Lower California, and a total of 303 valid? species for the world. A total of twenty species have been collected in Mississippi. Many of these species are difficult to separate in a key, but can readily be distinguished by a comparison of the male genitalia.

Key to Species.

1. Hemelytra abbreviated, membrane absent, cuneus rounded, reaching upon seventh abdominal segment . . . . . (female) oppositus

   Hemelytra entire, membrane present 2

2. Wing membrane conspurcate or irrorate with pale; median lobe of male genital structure provided with a flagellum, without or rarely bearing distinct teeth 3

   Wing membrane either marbeled, uniformly fuscous, or nearly pale, never distinctly conspurcate, sometimes with margins of fuscous areas breaking into small spots but then more marbeled than conspurcate; median lobe of male genital structure with a flagellum bearing distinct teeth 6

3. Third antennal segment with pale band only at base or with none 4

Third antennal segment with pale band at base and middle 5

4. Length of antennal segment I equal to or greater than width of head; length 7-7.8 mm. . . . . fenestratus

Length of antennal segment I not equal to width of head; length 4.0 mm. . . . . breviusculus

5. Dorsum with both black and white scale-like hairs, turned on edge; propleura pale on lower half but without a distinct white line above middle of coxal cleft; lower half of face with some fuscous spots . . . . . conspurcatus

Dorsum without scale-like hairs; propleura black with lower margin only white; lower half of face white . . . . . albifacies

6. Length of antennal segment I distinctly greater than width of head 13

Length of antennal segment I not equal to width of head 7

7. Posterior half of pronotum and hemelytra pale bluish green marked with fuscous spots . . (male) tillandsiae

Pronotum and hemelytra not bluish green 8

8. Membrane fuscous, veins distinctly red 11

Membrane hyaline to fuscous but veins not distinctly red 9

9. Membrane fuscous, veins white or yellowish at apex of the areoles . . . . . conspersipes

Membrane hyaline or fumate, veins concolorous . . . 10

10. Length of antennal segment II equal to about 2.5 times the length of segment I . . . . . uniformis

Length of antennal segment II almost equal to 3.5 times the length of segment I . . . . . angustifrons

11. Rostrum reaching upon hind coxae 12

Rostrum reaching upon base of genital segment in male and upon base of ovipositor in female . . . . taxodii

12. Hind femora reddish to fuscous with numerous pale spots, dorsal surface with a rather broad subapical band or transverse pale spot . . . . . pinicola

Hind femora a nearly uniform dark red with but few inconspicuous pale spots, never forming a band . . . . . rufus

13. Antennae more blackish or fuscous than pale, if segment II broadly pale on middle, then the dorsum chiefly fuscous to blackish; general color fuscous to blackish on a paler background 14

Antennae more pale, yellowish or reddish than blackish, segment II sometimes fuscous at apex and near base but more pale than fuscous; general color usually yellowish or reddish over a pale background 16

14. Vertex with a shallow but distinct median longitudinal impression; corium with a conspicuous white spot near inner apical angle . . bipunctatus

Vertex without a median impression; corium without conspicuous white spot near inner apical angle .15

15. Antennal segment II uniformly blackish with a pale band at base . . . . . neglectus

Antennal segment II pale fuscous, dark only at apex and next to pale basal band; corium without distinct black mark across apical area . . . salicis

16. Posterior half of pronotum and hemelytra pale bluish green marked with fuscous spots . . . . . (female) tillandsiae

Pronotum and hemelytra not bluish green 17

17. Pronotal disk with four orange or red vittae on a pale background 21

Pronotal disk frequently red but without four distinct reddish vittae on a paler background . . 18

18. Pronotum chiefly red, more red than pale or fuscous 19

Pronotum with more pale or fuscous than red; scutellum with an orange or reddish mark each side of median line 20

19. Hemelytra with distinct white irrorations; calli darkened with fuscous . . . . . confluens

Hemelytra with white irrorations obsolete, nearly uniformly deep orange-red; calli pale . (male) puella

20. Pronotal disk with base and lateral margins dark fusco-reddish; scutellum yellow, sometimes with a red mark at each side on apical half but without vittae at the middle of base . . . . . infuscatus

Pronotal disk chiefly pale, not distinctly darkened laterally nor at base; base of scutellum often with an orange colored vitta each side of median line and frequently extending to join with orange colored mark at each side of apical half . . . . . olseni

21. Antennal segment II pale but with a slender fuscous line on anterior surface; embolium and outer half of corium greenish yellow; clavus chiefly red to fuscous . . . . . tibialis

Antennal segment II pale, without a slender fuscous line on anterior surface; dorsum pale, hemelytra reticulately marked with orange or pale reddish . . . . . (female) puella

Phytocoris albifacies Knight.

Bul. Brooklyn Ent. Soc., xxi, No. 4, 159, 1926.

Male. Length 6.0 mm., width 2.1 mm.; general color fuscous black with pale spots; head fuscous to black, lower part of face, or beneath a line drawn through lower margin of eyes,

and a curved white mark against inner margin of each eye, white; antennal segments black with white markings, segment II with a pale band at base and another of equal width on middle, III, pale only at base; lower margin of propleura and lower portion of collar white; pronotal disk fuscous with two black calloused spots each side of median line, basal margin somewhat pale; scutellum fuscous to blackish, basal angles and apex pale; hemelytra blackish, several small spots on embolium, base of cuneus, a triangular spot at apex of corium and spot near middle, paler; membrane brownish black, having paler areas sprinkled with fuscous dots, veins surrounding large areole largely pale; legs black and marked with pale, dorsum clothed with rather short, simple pubescence intermixed with silvery and golden, sericeous pubescence; genital claspers distinctive.

Female very similar to male in coloration although somewhat less black.

Inhabits the bark of trees and is probably predaceous. Known only from Mississippi.

Agricultural College, June 11, 1912, (T. F. McGehee); Agricultural College, June 17, 1912, (W. E. Dove); Agricultural College, June 17, 1913, (T. F. McGehee).

Phytocoris conspurcatus Knight.

Bul. Brooklyn Ent. Soc., xv, 61, 1920.

Male. Length 5.9 mm., width 2.1 mm.; general color yellowish to fuscous; head yellowish tinged with red or fuscous; rostrum long, reaching upon genital segment; antennae black, segment I with numerous white spots, II, black, a pale band at base and middle, IV, black; pronotum yellowish to fuscous with black scale-like hairs; scutellum densely clothed with white, tomentose hairs; hemelytra rather uniformly fuscous, a pale triangular spot at apex of corium bordering cuneus, thickly clothed with black scale-like hairs and intermixed with small patches of white, tomentose hairs; membrane thickly conspurcate with dark fuscous spots, veins pale at apex of larger areole; legs pale, apices of femora fuscous with numerous pale spots, hind femora with a rather broad, pale transverse spot near apex nearly forming a complete band, tibiae annulate with pale and fuscous; genital segment with a long tubercle at base of left clasper; genital claspers distinctive.

Female very similar to male in size and coloration.

This is a predaceous bark-inhabiting species and is often attracted to lights. Not recorded south of District of Columbia.

A. and M. College, May 29, 1931, (light trap), (H. G. Johnston).

Phytocoris fenestratus Reuter.

Acta Soc. Sci. Fenn., xxxvi, No. 2, 24, 1909.

Male. Length 7.5 mm., width 2.6 mm.; general color red-

dish brown with yellow spots; antennae black, segment I reddish brown with pale spots; rostrum reaching upon third ventral abdominal segment; pronotum reddish brown, center of disk, calli and basal margin, pale; scutellum fuscous, apex and a line on basal angles yellow; hemelytra nearly uniformly reddish brown, corium with a pale spot near base, a larger one on middle and a small one near apex, cuneus with pale spot on each basal angle; membrane fuscous, conspurcate with pale, veins reddish, paler at apex of areoles; legs reddish, coxae and numerous small, irregular spots, pale; genital segment with short, blunt tubercle at base of left clasper; genital claspers distinctive of the species.

Female very similar to male in color and size.

Not recorded south of North Carolina.

A. and M. College, May 29, (light trap) (H. G. Johnston).

Phytocoris breviusculus Reuter.

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 69, 1876.

Male. Length 4.0 mm., width 1.5 mm.; general color yellow to fuscous; head yellow with a few, small, reddish to fuscous spots; antennae yellowish, segment I red with yellow spots, segments II and III narrowly pale at base; rostrum reaching upon base of genital segment; pronotum yellowish to fuscous, calli and center of disk paler; scutellum uniformly

fuscous; hemelytra a nearly uniform fuscous, somewhat darker along the claval suture, corium with a small spot at middle, and on basal half of cuneus, dull yellowish, membrane fuscous, conspurcate with pale, the veins fuscous; legs pale with red markings, front and middle tibiae with alternate red and yellow bands, hind femora fuscous on apical half with numerous small yellow spots, hind tibiae dark reddish with pale spots, not banded; genital segment with a small tubercle above the base of left clasper; genital claspers distinctive of the species.

This species is apparently nocturnal since it has been collected chiefly at lights.

Wiggins, May 29, 1931, (light trap) (J. P. Kislanko).

Phytocoris oppositus Knight.

Bul. Brooklyn Ent. Soc., xxi, 160, 1926.

Female (brachypterous). Length 4.5 mm., width 1.4 mm.; general color yellowish to fuscous marked with reddish brown or fuscous lines; head pale, a reddish brown to fuscous line each side of middle which join to form a single line on tylus; tylus prominent, distinctly separated from frons by a broad, deep depression, vertex distinctly flattened; antennae long and slender, length of segment I exceeds the combined length of head and pronotum, reddish brown, segment II, yellowish to fuscous, a pale band at base and a second broad-

er one beyond middle; rostrum pale, reaching upon fifth ventral segment; pronotum short, disk flattened, about on a level with vertex and scutellum, yellowish to fuscous, median line, a broader line each side, lateral and basal margins, pale; scutellum yellowish to fuscous, apical half pale with a fuscous spot each side of median line; hemelytra brachypterous, flattened, embolar margins arcuate, cuneus rounded, slightly, deflexed, reaching upon seventh abdominal segment, membrane absent, hemelytra pale and darkened with fuscous, outer margin of clavus and inner margin of corium fuscous; dorsum sparsely set with short, stiff, brown to fuscous hairs intermixed with fine, pale, sericeous pubescence, apex of clavus and cuneus with a dense group of black hairs; legs pale, front and middle femora with longitudinal fuscous lines, hind femora with fuscous lines confused, chiefly fuscous, tibiae pale, front tibiae indistinctly banded.

Collected on mixed vegetation in pine woods. Only two females are known.

Aberdeen, June 26, 1921, (C. J. Drake); Starkville, June 13, 1929, (H. G. Johnston).

Phytocoris bipunctatus Van D.

Trans. Am. Ent. Soc., xxxvi, 77, 1910.

Male. Length 4.1 mm.; width 1.2 mm.; general color

reddish brown to fuscous marked with white; head yellowish brown with a shallow but distinct median impression on front; antennae reddish brown, segment I with distinct white spots, II, with a pale band near base and a similar one just beyond middle, III, broadly pale at base and a similar band beyond middle, IV, black; rostrum reaching upon fifth ventral; pronotum chiefly fuscous, narrow basal margin with a white sinuate line interrupted by four, distinct, elevated tubercles bearing tufts of short, black hairs; scutellum pale yellowish, fuscous on lateral margins; hemelytra fuscous, embolar margin with alternate white and fuscous spots, corium with a distinct white spot near inner apical angle; membrane fuscous, veins fuscous; legs reddish brown, femora pale at base, front tibiae with three conspicuous white bands, middle and hind tibiae with numerous white spots; genital segment with a broad, shallowly bifurcate tubercle above base of left clasper; genital claspers distinctive.

Female similar in size and coloration to male.

Collected on sparse grasses in pine woods. Recorded only from Florida.

Wiggins, April 25, 1931, (H. G. Johnston).

Phytocoris neglectus Knight.

Bul. Brooklyn Ent. Soc., xv, 54, 1920.

Male. Length 6.2 mm., width 2.2 mm.; general color fuscous with numerous pale spots; head yellowish marked with fuscous, front with oblique, fuscous lines each side of median line; antennal segment I yellowish, with irregular fuscous spots, II, uniformly blackish with narrow white band at base, III and IV, fuscous to black; rostrum reaching upon base of genital segment; pronotum fuscous, calli and narrow basal margin pale, with four sub-basal tufts of short, stiff, black hairs; scutellum yellowish with two diverging, black marks near apex; hemelytra fuscous with numerous, irregular, pale spots, a rather large, triangular, pale spot on inner apical angle of corium; membrane fuscous with large pale areas on central portion, veins pale at apex of areoles; legs pale, apices of femora with numerous pale spots, tibiae banded with pale, the front with three, the middle with four, and the hind with only one, pale band; genital claspers and flagellum distinctive of the species.

Female very similar in size and coloration.

Found on trunks of trees where it is probably predaceous on soft-bodied insects. Not recorded south of Michigan and New York.

Corinth, May 25, 1931, (H. G. Johnston).

Phytocoris salicis Knight.

Bul. Brooklyn Ent. Soc., xv, 56, 1920.

Male. Length 6.0 mm., width 2.1 mm.; very similar to neglectus but distinctly more yellowish brown above; fuscous coloration of hemelytra with brownish maculations; antennal segment II pale yellowish to fuscous, becoming dark only near base and at apex; membrane paler on the central area and with a median pale area extending to apex; genital claspers and flagellum distinctive of the species.

Female similar in size and coloration to the male.

Breeds on willow where the species is apparently predaceous on soft-bodied insects.

Carthage, May 2, Wiggins, May 5, Tylertown, May 12, Tchula, May 18, 1931, (H. G. Johnston).

Phytocoris pinicola Knight.

Bul. Brooklyn Ent. Soc., xv, 59, 1920.

Male. Length 5.2 mm., width 1.8 mm.; general color reddish brown marked with yellow; head yellowish with irregular red markings; antennae blackish, segment I reddish to fuscous with pale yellowish, glabrous spots, two brownish setae on margins of each spot; rostrum reaching apex of hind coxae; pronotum yellowish, lateral and sub-basal margins reddish brown, narrow basal margin yellow; scutellum reddish brown, apex yellow; hemelytra reddish brown, embolar margin and outer margin of cuneus with alternate white and fuscous spots; membrane fuscous, veins red; dorsum clothed with short, stiff,

brown to black hairs and intermixed with silvery, sericeous pubescence; legs reddish to reddish brown with numerous yellow spots; genital claspers and flagellum distinctive of the species.

Female similar to male in coloration but slightly more robust.

Breeds on several species of pine (Pinus).

Carthage, June 7, West Point, June 19, Port Gibson, July 29, Brookhaven, August 3, Laurel, August 14, Newton, August 15, 1929, (H. G. Johnston).

Phytocoris angustifrons Knight.

Bul. Brooklyn Ent. Soc., xxi, 164, 1926.

Male. Length 5.1 mm., width 1.7 mm.; general coloration similar to pinicola but somewhat paler; head, width 1.13 mm., vertex .31 mm., readily distinguished from pinicola by the large eyes and narrow vertex, yellowish with scattered reddish marks; antennal segment I, reddish to fuscous with numerous pale yellowish, glabrous spots, two brownish setae on margins of each spot, II, brownish to black, narrowly pale at base, III, black, narrowly pale at base, IV, black; rostrum scarcely surpassing apex of hind coxae; pronotum yellowish to dusky, darker on sub-basal margin, narrow basal margin pale; hemelytra reddish brown, somewhat paler than in pinicola, outer margin of cuneus with three or four fuscous

spots; legs much as in pinicola but coxae and base of femora paler, dorsal margin of hind tibiae with white line, not broken into spots; genital claspers and flagellum distinctive of the species.

Female quite similar to male in size and coloration.

Recorded only from Florida, Mississippi, and Louisiana.

Described by Blatchley (Heteroptera E. North Amer., 713, 1926) as P. megalopsis, a synonym.

Aberdeen, June 25, Ocean Springs, August 4, 1921, (C. J. Drake).

Phytocoris conspersipes Reuter.

Acta Soc. Sci. Fenn., xxxvi, No. 2, 22, 1909.

Male. Length 4.7 mm., width 1.8 mm.; coloration similar to pinicola; antennal segment II black, narrowly pale at base; rostrum distinctly surpassing apex of hind coxae; pronotum chiefly yellowish, narrow basal margin sometimes yellowish; alternate fuscous and white spots on embolar margin and outer margin of cuneus scarcely evident; membrane fuscous, veins fuscous except at apex of areoles where they are yellowish; legs reddish with spots less distinct; genital claspers distinctive of the species.

Female very similar to male in coloration and in size.

Breeds on Pinus virginiana and P. glabra. Not recorded south of North Carolina.

Poplarville, May 11, 1931, (H. G. Johnston).

Phytocoris uniformis Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 643, 1923.

Male. Length 5.2 mm., width 1.8 mm.; general color a rather uniform yellowish brown; rostrum scarcely surpassing apex of hind coxae; antennal segment I, brownish, paler irrorations nearly obsolete, II, rather uniformly fuscous, darker apically, III, black, narrowly pale at base, IV, black; pronotum uniformly yellowish brown; scutellum scarcely darker than the pronotum; hemelytra uniformly yellowish brown, translucent, sometimes tinged with reddish on the base of cuneus; dorsum clothed with recumbent, golden yellow pubescence and intermixed with tufts of white, sericeous pubescence; membrane uniformly fumate, the veins scarcely darker; legs pale to yellowish, femora reddish brown and irrorate with pale, the hind femora with a rather large subapical pale spot on dorsal surface; tibiae with small reddish spots; genital claspers and flagellum distinctive of the species.

Female slightly more robust than the male but very similar in coloration and pubescence.

Breeds on Pinus taeda and P. echinata. Not recorded south of North Carolina.

Carthage, June 7, Columbus, June 20, Port Gibson, July 29, Brookhaven, August 3, Laurel, August 14, Newton, August

15, 1929, (H. G. Johnston).

Phytocoris rufus Van D.

Bul. Buffalo Soc. Nat. Sci., x, 477, 1912.

Male. Length 4.8 mm., width 1.6 mm.; general color a uniform reddish brown; head yellow to reddish; antennal segment I uniformly dark reddish, II, pale reddish becoming fuscous on apical fourth, III and IV, fuscous to black; rostrum scarcely surpassing apex of hind coxae; pronotum fuscous, calli, central portion of disk, and narrow basal margin yellowish; scutellum a rather pale reddish brown; hemelytra with embolium, outer margin of cuneus and along commissure yellowish; membrane fuscous to black, veins dark red; dorsum sparsely clothed with suberect brownish hairs; legs a nearly uniform dark red, coxae yellow, tarsi fuscous; genital claspers distinctive of the species.

Female very similar to male in size and coloration.

Breeds on St. Andrews Cross (Ascyrum stans). Recorded only from Florida, Mississippi, and Louisiana.

Wiggins, May 5, Poplarville, August 8, New Augusta, August 12, 1929, (H. G. Johnston); Big Point, July 13, 1920, (H. L. Dozier).

Phytocoris taxodii Knight.

Bul. Brooklyn Ent. Soc., xxi, 165, 1926.

Male. Length 5.1 mm., width 1.7 mm.; general color

similar to rufus but more yellowish with red; head yellow, sometimes tinged with red; antennae a nearly uniform pale yellow, segment I narrowly red at base and segments III and IV slightly fuscous; rostrum reaching upon genital segment; pronotum reddish, becoming reddish brown on sub-basal margin, narrow basal margin yellow; scutellum yellow or tinged with reddish; hemelytra yellowish to red, embolar margin and outer margin of cuneus yellow; membrane fusco-brownish, veins distinctly red; clothed with golden yellow, simple pubescence, and intermixed with more closely appressed, sericeous, silvery white pubescence; legs yellowish; hind femora dark red except on basal third, irrorate with small yellowish spots, hind tibiae more or less reddish at base; genital claspers distinctive of the species.

Female quite similar to male in size, coloration, and pubescence.

Breeds on cypress (Taxodium distichum). Recorded only from Georgia, Mississippi, and Louisiana.

Vicksburg, June 18, Durant, July 15, Natchez, July 27, 1921, (C. J. Drake); Carthage, June 7, Catchings, June 29, Rolling Fork, July 25, Columbia, August 6, 1929, (H. G. Johnston).

Phytocoris tillandsiae Johnston.

Bul. Brooklyn Ent. Soc., xxx, 18, 1935.

Male. Length 5.0 mm., width 1.6 mm.; general color a pale bluish green clouded with fuscous; head rather uniformly pale yellowish green; antennal segment I, pale yellowish green indistinctly marked with irregular fuscous spots, II, rather uniformly yellow to fuscous, III and IV, fuscous; rostrum fuscous with segment I pale green, reaching upon middle of venter; pronotum pale bluish green, collar and calli yellow to fuscous; scutellum pale green, a vague fuscous spot on each side of apical half; hemelytra bluish green clouded with fuscous, embolium pale green with numerous irregular fuscous spots, inner margin of clavus and along the commissure pale, cuneus pale green clouded with fuscous, apex white; membrane fuscous, veins white around apex of areoles; dorsum clothed with simple, yellowish to brown hairs and intermixed with tufts of white sericeous pubescence; legs pale green, femora fuscous on apical half, closely spotted with small green spots, apical two-thirds of hind tibiae fuscous with large pale green spots; genital claspers distinctive of the species.

Female quite similar to male in size, coloration, and pubescence.

Breeds on Spanish moss (Tillandsia usneoides). Known only from Mississippi and Texas.

Biloxi, April 16, Columbia, May 12, 1931, (H. G. Johnston).

Phytocoris infuscatus Reuter.

Acta Soc. Sci. Fenn., xxxvi, No. 2, 20, 1909.

Male. Length 5.3 mm., width 1.9 mm.; general coloration dark reddish marked with white; head reddish yellow with dark red markings on tylus, juga, lora and between bases of antennae; antennae a nearly uniform yellow, sometimes slightly dusky on first and fourth segments; rostrum yellow, nearly attaining base of genital segment; pronotum yellowish to dark red, dorsal portion of collar, calli and just behind calli yellow to orange; scutellum yellow, a reddish spot on margin each side of apical half; hemelytra red to dark red, irrorate with more or less confluent white spots, basal half darker red to fuscous, cuneus more deeply red with small pale spots on middle; membrane fumate to brown, veins slightly paler at apex of areoles; legs pale to yellowish, hind femora fuscous to black on apical two-thirds with large and small yellowish spots, a yellowish band on apical half, front tibiae with an indistinct brownish band on middle and near base, hind tibiae with broad reddish band at base; genital claspers and flagellum distinctive of the species.

Female similar to male in size and coloration, but somewhat more robust and more broadly pale on apical half of corium, with pale and orange rays behind calli.

Breeds on hickory (Carya). Not recorded south of North Carolina.

Wiggins, May 5, Carthage, June 7, 1931, (H. G. Johnston).

Phytocoris olseni Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 647, 1923.

Male. Length 6.1 mm., width 2.2 mm.; general coloration yellow to yellowish brown with red to fuscous markings; head pale yellowish usually with orange-red markings; antennae rather uniformly yellowish to yellowish brown; rostrum yellowish, reaching to seventh ventral segment; pronotum pale yellowish to brownish, darker on lateral margins of disk; scutellum yellow, frequently with orange colored vitta each side of median line at base and sometimes extending to join with orange mark each side of apical half; hemelytra pale yellow to brownish, outer half of clavus and middle of corium brown to fuscous, embolium pale, irregularly marked with reddish orange, cuneus pale yellowish with small, irregular red spots; membrane brownish, veins paler at apex of large areole; pronotum and hemelytra clothed with yellowish, simple, pubescent hairs, intermixed with sericeous, golden pubescence, and tufts of white, tomentose pubescence; legs chiefly pale to yellowish, hind femora brownish with reddish on apical half, front tibiae with reddish brown band at middle and one on basal half, hind tibiae reddish near base, spines brown; genital

claspers distinctive of the species.

Female quite similar to male but hemelytra more broadly pale, clavus yellowish brown with irregular pale areas.

Known only from New York, New Jersey, and Virginia.

Wiggins, May 5, Water Valley, May 12, Corinth, May 25, 1931, (H. G. Johnston).

Phytocoris tibialis Reuter.

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 68, 1876.

Male. Length 5.1 mm., width 1.9 mm.; general color greenish yellow marked with red and fuscous; head orange-yellow; antennae rather uniformly yellow, segment I with oblique red marks on inner dorsal surface, II, with a very narrow fuscous line on anterior surface; rostrum reaching base of genital segment; pronotum greenish yellow with four distinct, longitudinal, orange-red stripes; hemelytra greenish yellow, clavus and inner margin of corium orange-red to fuscous with irregular pruinose areas, cuneus with apex and a rather large spot at inner basal angle red; membrane fuscous, veins reddish, pale at apex of large areole; dorsum clothed with yellow, simple hairs and intermixed with patches of silvery, sericeous pubescence; legs yellow, apex of femora fuscous with numerous yellow spots, hind femora with three broad, transverse yellow spots on dorsal surface of apical

half, front and middle tibiae with a reddish to black line on dorsal surface; genital claspers distinctive of the species.

Female very similar to the male in size, coloration, and pubescence.

Breeds among rank growing herbaceous weeds growing in shaded, damp situations.

This species is readily distinguished by the fuscous lines on second antennal and the front and middle tibiae. Widely distributed east of the Rocky Mountains from Southern Canada to Central America.

Wiggins, May 29, Carthage, June 8, Columbus, June 20, Catchings, June 29, Natchez, July 31, Tylertown, August 8, Ackerman, August 19, 1929, (H. G. Johnston).

Phytocoris confluens Reuter.

Acta Soc. Sci. Fenn., xxxvi, No. 2, 20, 1909.

Male. Length 4.6 mm., width 1.4 mm.; general coloration bright red with pale or yellow markings; head chiefly bright red with few pale spots; antennae a nearly uniform yellow, segment I somewhat reddish yellow; rostrum yellow, reaching upon sixth abdominal segment; pronotum deep red, calli fuscous with a pale ray or spot behind each callus, narrow basal margin, except humeral angles, pale yellowish; scutellum red, basal angles and apex yellow; hemelytra red,

conspurcate with small to medium sized spots, cuneus with pale spots on inner margin and across middle; membrane uniformly fuscous, veins bright red; dorsum clothed with yellowish to dusky, simple pubescence intermixed with yellow, sericeous pubescence which may be white over the pale areas; legs pale to yellow, front femora reddish yellow apically, hind femora red, pale at base, with many small pale spots; hind tibiae with red marks at base; genital claspers and flagellum distinctive of the species.

Frequently found on hickory (Carya). Not recorded south of District of Columbia and Ohio.

A. and M. College, May 29, 1931, (light trap) (H. G. Johnston).

Phytocoris puella Reuter.

Ofv. Kongl. Sv. Vet. - Akad. Forh., xxxii, No. 9, 69, 1876.

Male. Length 5.0 mm., width 1.5 mm.; general color orange to red with numerous yellow spots; head yellowish with very small red marks; antennae uniformly yellow; rostrum reaching upon fifth ventral, yellow, apex brown; pronotum yellowish to orange-red, calli yellow, posterior half of disk with rather large, irregular, bluish green spots; scutellum yellow, a broad red band across middle; hemelytra red with rather uniformly distributed, medium sized, yellow spots, the

spots on basal area with a faint bluish tinge; membrane pale fuscous, veins white at apex of areoles; clothed with simple, yellowish hairs and intermixed with tufts of silvery, sericeous pubescence; legs pale yellow, apical two-thirds of hind femora and hind tibiae reddish to fuscous with numerous yellow spots; genital claspers and flagellum distinctive of the species.

Female. Length 4.9 mm., width 1.9 mm.; general color much paler than male being chiefly pale yellowish with orange markings; head pale with front, lora, and bucculae marked with orange on anterior surface; pronotum pale yellowish with four orange stripes, anterior angles with orange stripe which extends upon collar; scutellum pale yellow with an oblique orange vitta each side of apical half; hemelytra pale, rather uniformly reticulate with orange, cuneus with red along lateral margins; membrane pale, more or less conspurcate with fuscous, veins yellowish, pale at apex of areoles; legs quite similar to male.

Breeds on birch (Betula nigra). These specimens differ considerably in coloration from specimens described by Dr. Knight (Hemip. Conn., 653, 1923).

Columbia, August 6, Laurel, August 14, 1929, (H. G. Johnston).

Tribe Myrmecorini.

Key to Genera.

Antennal segment I in length distinctly greater than width of head; scutellum not conically produced; dorsum with fine short pubescence . . . . . Paraxenetus

Antennal segment I in length scarcely greater than width of vertex; scutellum conically produced dorsally; dorsum with long, erect, pilose hairs . . . . . Barberiella

Genus Paraxenetus Reuter, 1907.

Elongate, slender, ant-like species having the head short, broad, slightly exserted, its front vertical; vertex with a distinct narrow, longitudinal sulcus; eyes large, prominent; pronotum subcampanulate, lateral margins indistinct; hemelytra entire, coarctate on middle; abdomen constricted at base. One species is known.

Paraxenetus guttulatus (Uhler).

Ent. Amer., iii, 150, 1887.

Length 6.2 mm., width 1.2 mm.; general color a rather uniform reddish brown; antennae uniformly yellow, segment IV, reddish to fuscous; scutellum brown, apex yellow; hemelytra reddish brown, a pale spot on middle of corium, at apex of

clavus, and on the base of cuneus, embolar margins strongly concave on the middle; membrane fuscous tinged with red, veins bright red; clothed with recumbent, fine yellowish pubescence; legs yellowish, coxae, apex of front and middle femora, the hind femora and basal half of hind tibiae, red to brown; hind femora with long, pilose hairs; tibial spines long and slender.

Female very similar to male in form and coloration, sometimes more broadly reddish.

Breeds on grape (Vitis sp.). Rather widely distributed through the eastern and southern United States.

Catchings, June 29, Rolling Fork, July 25, 1929, (H. G. Johnston).

Genus Barberiella Poppius, 1914.

Slender, ant-like species with head long, strongly vertical, vertex and base of front distinctly flattened, without median sulcus; eyes flat, greatly elongate; pronotum with apical third subcylindrical, posterior lobe strongly convex and flaring to posterior margin; scutellum conically produced upward; hemelytra strongly constricted at middle, disk nearly flat; hind tibiae compressed, strongly curved.

Barberiella apicalis Knight.

Conn. Geol. and Nat. Hist. Survey, Bul. 34, 657, 1923.

Male. Length 5.0 mm., width 1.6 mm.; general color reddish brown to dark brown; head long, broad, strongly vertical, vertex and base of front strongly impressed along median line but not grooved; antennae dark brown, segment I often paler, segment II, subcylindrical although noticeably more slender near base, in thickness slightly greater than segment I; pronotum reddish brown to dark brown usually darker anteriorly, disk strongly convex, calli scarcely apparent but with two impressed points between; mesoscutum broadly exposed, sloping downward to base of scutellum from which it is indistinctly separated; scutellum conically produced dorsally, the apex bent, extending posteriorly; hemelytra with embolar margins strongly constricted at middle, disk nearly flat, cuneus strongly declivent; clavus dull brownish, a triangular pruinose area extending upon middle from corium, corium dull fusco-brownish, a pale transverse spot near middle followed by a distinct, brownish, fuscous, transverse band, bordered by a narrow, transverse, pruinose band, cuneus uniformly dark brown, shining; membrane uniformly fuscous, veins scarcely darker; legs uniformly dark brown, femora sparsely clothed with pale erect hairs, hind tibiae compressed, strongly curved, with yellow spine-like hairs.

Female very similar to male in form and coloration;

the anterior lobe of pronotum somewhat broader, less cylindrical, antennal segment II clavate apically, exceeding thickness of segment I; abdomen broader apically.

Collected on mixed shrubs and herbaceous vegetation. Feeding habits unknown. Recorded from Staten Island and Long Island, New York. Described by Blatchley (Heteroptera E. North Amer., 808, 1926) as Pilophorus brimleyi from North Carolina.

Anguilla, July 3, Rolling Fork, July 23, Yazoo City, July 27, Vicksburg, July 27, 1929, (H. G. Johnston).

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VITA

My father's name is Andrew Aron Johnston; my mother's maiden name was Ellie Mae Sanders. I was born on April 26, 1902 and was reared on a farm near Carthage, Mississippi.

I received my grammar school training in a rural school near Carthage, and completed my high school work at the Leake County Agricultural High School, located at Carthage, in May 1921.

After graduating from high school, I taught for one year in a rural school in Leake County and entered the School of Science, Mississippi State College, in September 1922. I received the Bachelor of Science degree with a major in zoology in June 1926. In September 1926 I entered Iowa State College as a graduate assistant and received the Master of Science degree with a major in entomology in August 1928. My thesis for this degree was the Host Plant Relationships of the Family Miridae (Hemiptera). In September 1927, I accepted a position as assistant professor at Texas A. & M. College, and have been employed there since that time.

In June 1930 I was granted a one year leave of absence by Texas A. & M. College to continue graduate studies at

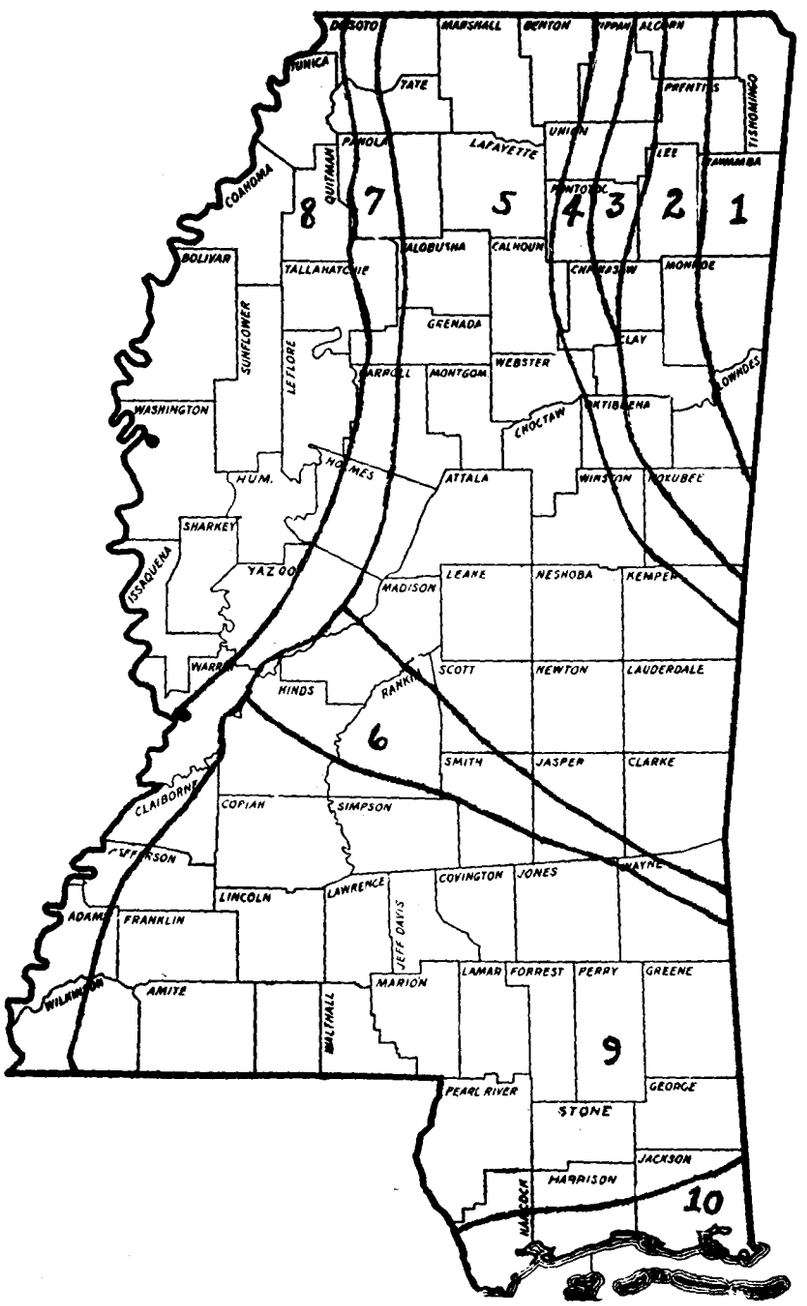
Iowa State College. I completed the residence requirement and was admitted to candidacy for the degree of Doctor of Philosophy in March 1931. My major work at Iowa State College has been under the direction of Dr. Harry Hazelton Knight. I graduated from Iowa State College August 29, 1936, receiving the degree of Doctor of Philosophy, with a major in entomology and minors in zoology and plant ecology.

I was married August 31, 1931, to Frances Caldwell. We have one son, George Greely, born January 17, 1935.

FIGURE I.

Soil Types and Floristic Areas.

1. Tennessee River Hills.
2. Northeastern Prairie Belt.
3. Pontotoc Ridge.
4. Flatwoods.
5. North Central Plateau.
6. Jackson Prairie Belt.
7. Loess or Bluff Region.
8. Yazoo-Mississippi Delta Region.
9. Long Leaf Pine Belt.
10. Coastal Pine Meadows.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COAHOMA
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PONTOTOC
BOLIVAR
TALLAHATCHIE
YALOBUSHA
CALHOUN
CHICKASAW
MONROE
GRENADA
CLAY
SUNFLOWER
LEFLORE
CARROLL
MONTGOM.
WEBSTER
LOWNDES
WASHINGTON
CHOCTAW
OKTIBBEHA
HUM.
HOLMES
ATTALA
WINSTON
NOXUBEE
SHARKEY
ISSAQUENA
YAZOO
MADISON
LEAKE
NESHOBA
KEMPER
WARREN
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LAUDERDALE
6
SMITH
JASPER
CLARKE
CLAIBORNE
COPIAH
SIMPSON
JEFFERSON
COVINGTON
JONES
WAYNE
LINCOLN
LAWRENCE
ADAMS
FRANKLIN
JEFF DAVIS
WILKINSON
AMITE
MARION
LAMAR
FORREST
PERRY
GREENE
BILOXI
9
PEARL RIVER
STONE
GEORGE
JACKSON
HARRISON
HANCOCK
10

Figure I.

PLATE I.

Plagiognathus caryae Knight.

Fig. 1. Egg, X nearly 47.

Fig. 2. First instar nymph, X about 41.

Fig. 3. Second instar nymph, X nearly 34.

Fig. 4. Third instar nymph, X about 26.

Fig. 5. Fourth instar nymph, X nearly 24.

Fig. 6. Fifth instar nymph, X about 23.

Fig. 7. Adult stage, X nearly 19.

Fig. 1

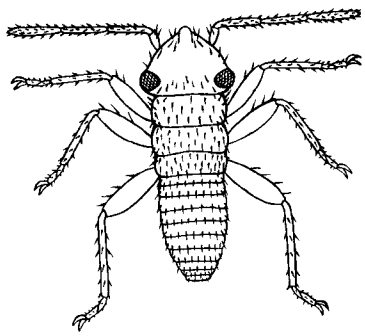

Fig. 2

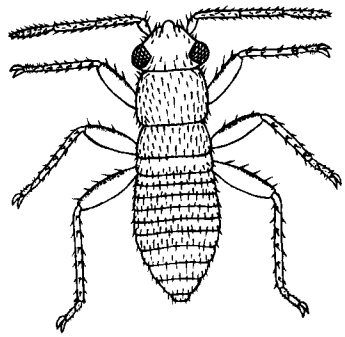

Fig. 3

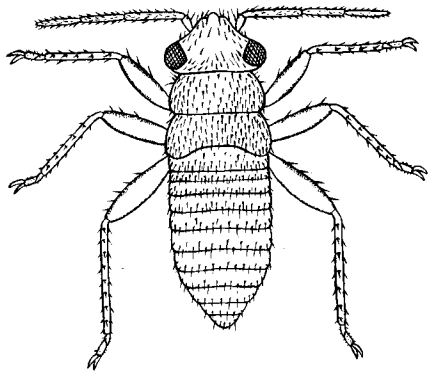

Fig. 4

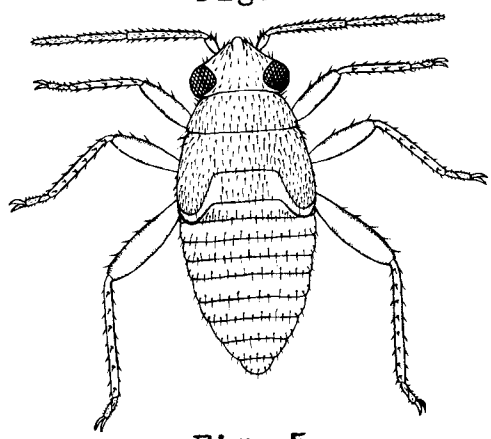

Fig. 5

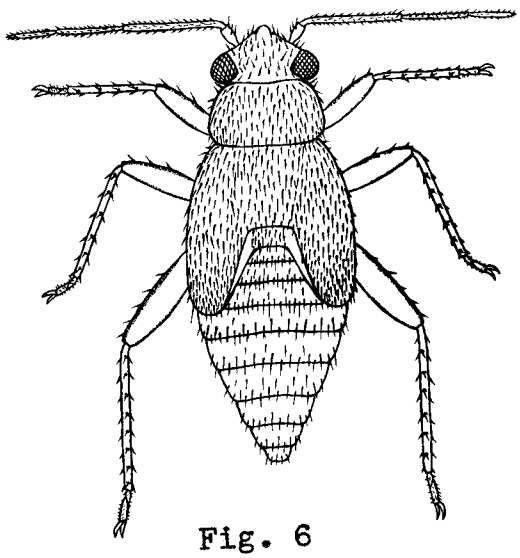

Fig. 6

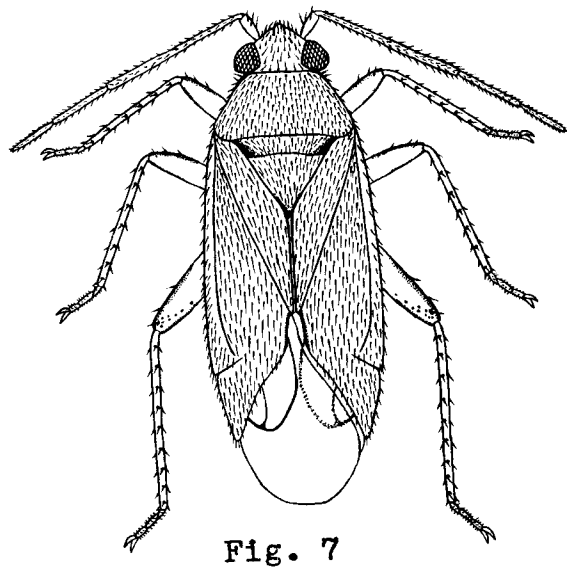

Fig. 7

Plate I.

PLATE II.

Orthotylus ramus Knight.

Fig. 1. Egg, X about 48.

Fig. 2. First instar Nymph, X about 42.

Fig. 3. Second instar nymph, X about 37.

Fig. 4. Third instar nymph, X nearly 26.

Fig. 5. Fourth instar nymph, X 25.

Fig. 6. Fifth instar nymph, X 19.

Fig. 7. Adult stage, X 16.

Fig. 1

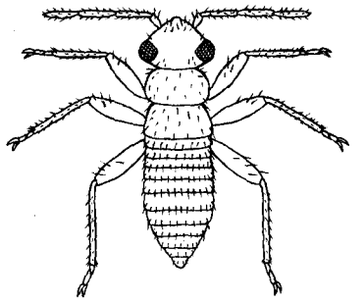

Fig. 2

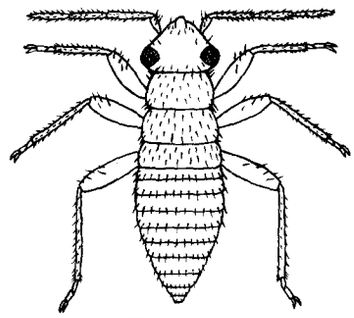

Fig. 3

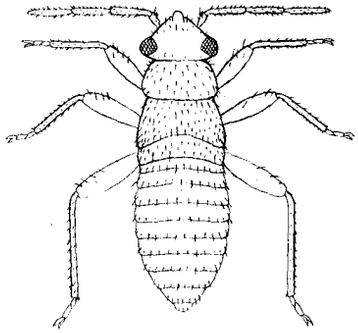

Fig. 4

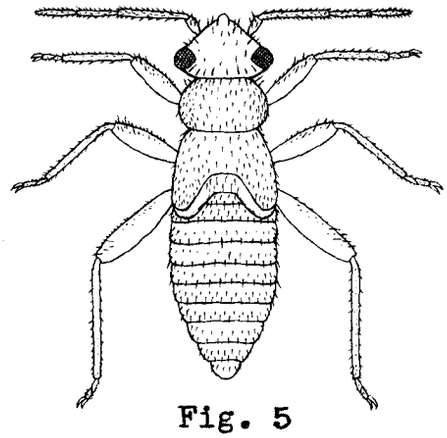

Fig. 5

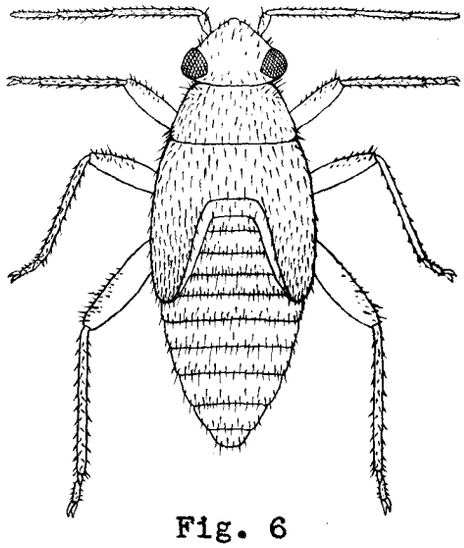

Fig. 6

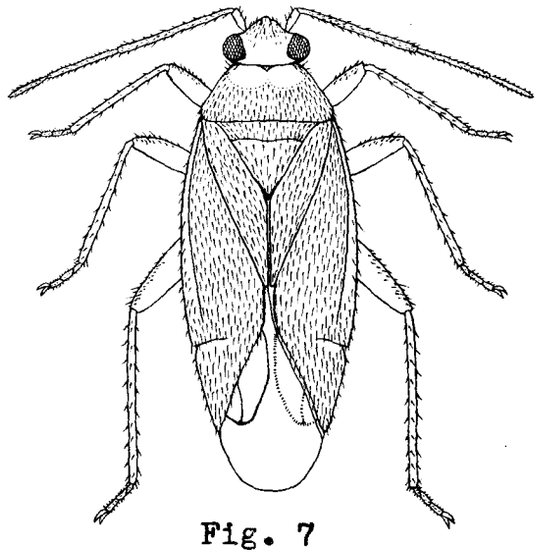

Fig. 7

Plate II.

PLATE III.

Orthotylus ramus Knight - illustrating the structural terms used in the classification of Miridae.

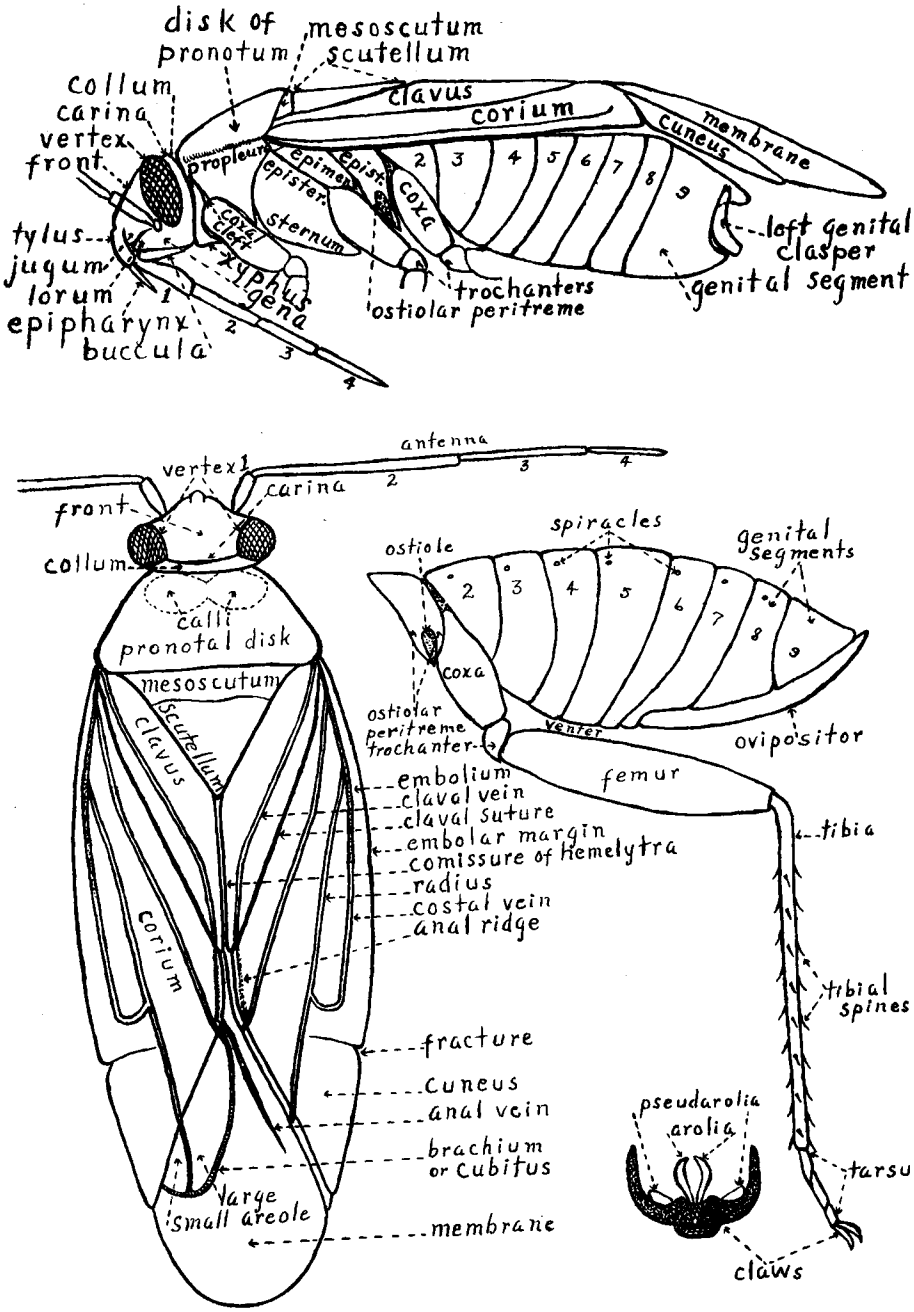
disk of pronotum
mesoscutum
scutellum
collum
carina
vertex
front
clavus
corium
membrane
cuneus
propleura
epimera
episternum
episternal cleft
sternum
coxa
tylus
jugum
lorum
epipharynx
buccula
xiphus
gena
trochanters
ostiolar peritreme
left genital clasper
genital segment
antenna
vertex
carina
front
collum
call
pronotal disk
mesoscutum
scutellum
clavus
corium
ostiole
spiracles
genital segments
coxa
ostiolar peritreme
trochanter
venter
ovipositor
embolium
claval vein
claval suture
embolar margin
comissure of hemelytra
radius
costal vein
anal ridge
fracture
cuneus
anal vein
brachium or cubitus
large areole
small areole
membrane
femur
tibia
tibial spines
pseudarolia
arolia
tarsus
claws

Plate III.